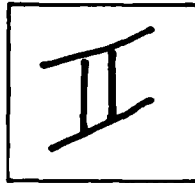


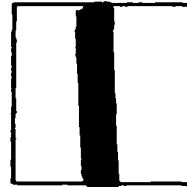
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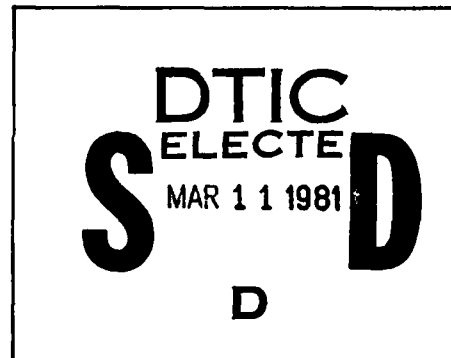
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READINESS COMMAND**



**DETAILED TEST PLAN
FOR
VALIDATION OF CLOSE AIR SUPPORT (CAS)
PHASE II RESULTS**

NOVEMBER 1973

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LIST OF ABBREVIATIONS

ADA	Air Defense Artillery
ALO	Air Liaison Officer
ASRT	Air Support Radar Team
C2	Command and Control
CAS	Close Air Support
CPX	Command Post Exercise
CRC	Control and Reporting Center
CRP	Control and Reporting Post
DASC	Direct Air Support Center
DCP	Data Collection Plan
DDR&E	Director, Defense Research & Engineering
FAA	Federal Aviation Agency
FAC	Forward Air Controller
FACP	Forward Air Control Post
FCC	Flight Coordination Center
FEBA	Forward Edge of the Battle Area
FLIR	Forward Looking Infra Red
FOC	Flight Operations Center
FSCC	Fire Support Coordination Center
GAF	Ground Alert Forward
GLLD	Ground Laser Locator Designator
IDA	Institute for Defense Analyses
LTDS	Laser Target Designation System
MAB	Marine Amphibious Brigade
MACCS	Marine Air Command and Control System
MAF	Marine Amphibious Force
MAU	Marine Amphibious Unit
NOE	Nap-of-the-Earth
RMS	Range Measuring System
SACC	Supporting Arms Coordination Center
TAC(A)	Tactical Air Coordinator (Airborne)
TACC	Tactical Air Control Center
TACC	Tactical Air Command Center (Marine Corps)
TACP	Tactical Air Control Party
TACS	Tactical Air Control System
TADC	Tactical Air Direction Center
TAOC	Tactical Air Operations Center
TATC	Tactical Air Traffic Control
TDS	Tactical Data System
TOC	Tactical Operations Center
TOE/TE	Table of Organization and Equipment/Table of Equipment
TPC	Test Plan Concept
TUOC	Tactical Unit Operations Center
VRS	Voice Recording System
WSEG	Weapons Systems Evaluation Group

SUMMARY

1. General.

a. The purpose of the Detailed Test Plan (DTP) is to outline the procedures and methodologies for conduct of the Close Air Support (CAS) validation program in reducing uncertainties of the command and control portion of the JCS Phase II Study of CAS. The Data Collection Plan, Test Plan Concept, additional JCS guidance and the Individual Test Plans for specific exercises, were used in developing this plan. Emphasis has been placed on collection of quantitative data for ten of eleven JCS specified objectives in eight selected training exercises. (Objective #5, Training, will be addressed separately by the Services directly to JCS.) To ensure as complete coverage as possible, other sources of information such as CPX, combat data, results from ongoing joint tests and subjective comments may be used in the overall validation.

b. The CAS validation objectives are extremely broad in scope. When coupled with the additional guidance provided in JCSM 223-73 (1 May 73) and JCSM-306-73 (26 Jun 73) an even broader scope was outlined. It is not feasible, however, to evaluate all possible combinations of operational, environmental and CAS system conditions. Therefore, an approach was employed which (1) identified the minimum number of conditions required to satisfy objectives; (2) established a base case of CAS operational and environmental conditions to be used as a standard; and (3) identified deviations from the base case required to satisfy the objectives.

c. Some degree of influence on scenario preparation and execution for individual exercises is required to insure that the base case and deviations from the base case are in accordance with a specified test design. Some control also is required to insure that an adequate sample size of mission related data can be collected for analysis and that proper quantitative data analysis procedures are established. Each scenario should attempt to insure generation of a sufficient number of the necessary CAS targets to exercise the applicable command and control systems described in this test plan. A Detailed Analysis Plan will be published by the Validation Headquarters as an addendum to this plan to further assist sponsoring Commands in accommodating validation requirements in the selected exercises.

d. Many operational and environmental constraints to the validation program are recognized. Though they apply to all of the validation exercises, the degree of impact of any one constraint may vary widely between exercises because of location, size, scenario, etc. The following are considered to be primary constraints.

(1) Priority of training objectives over validation objectives (directed by JCS).

(2) Safety considerations.

e. While some objectives such as #1 (Response Times) can be substantially documented, others such as #4 (Capacity) can be documented only to a limited degree because of both internal and external constraints. Additionally, some objectives such as #9 (Intelligence) do not readily lend themselves to quantitative data collection.

2. Execution.

a. All command and control elements of the three CAS command and control networks will be deployed during the selected exercise program; however, in a specific exercise the command and control system will be task organized to meet exercise training objectives and all system elements may not be deployed.

b. The types of aircraft which may be employed for CAS missions in the validation program are as follows:

<u>Air Force</u>	<u>Army</u>	<u>Navy</u>	<u>Marine Corps</u>
A-7	AH-1G	A-6	A-4
A-37		A-7	A-6
AC-130		F-4	AV-8
F-4			F-4
F-100			
F-105			
F-111			

Specific types and numbers of aircraft will be included in the Detailed Individual Test Plan for each exercise.

c. This plan specifies the data to be collected in exercises using manual data collection forms. It is recognized that differences in the three Service CAS command and control networks may make a revised format desirable. Therefore, sponsoring commands may, at their discretion, substitute locally designed worksheets for use by data collectors in the field; however, the worksheet data must be transcribed to the appropriate Joint Data Collection Form to insure data standardization and ease of computerization.

3. Validation Headquarters. A Joint USREDCOM/LANTCOM Validation Headquarters was approved in the Test Plan Concept to provide guidance and direction for data collection and reduction and for the analytical phase of the validation program. The USREDCOM CAS Division of the J-5 Directorate, supplemented by two officers from LANTCOM, constitute the nucleus of the organization. During exercises the Validation Headquarters in the field may be composed of up to 21 personnel. This includes a three officer Request Phase Team and a three officer Execution Phase Team assigned TDY for the exercise. Not included in these numbers are the four Operations Analyst augmentees who will not normally be deployed to the field; they will assist in formulating the overall Detailed Analysis Plan prior to the first exercise and will also assist in the quantitative analysis of exercise results. The field functions of the Joint CAS Validation Headquarters are to:

- Provide continuity and standardization of data collection.
- Monitor collection of data.
- Supervise the data reduction effort.

4. JCS Approved CAS Validation Exercises.

a. JCS, in approving the Test Plan Concept, approved nine exercises as data sources to validate the CAS Phase II Study Results during the period 1 Jan 74 through 30 Jun 75. Subsequently, the Pacific Command requested and JCS approved the deletion of FREEDOM TORCH II. Sufficient data to provide credible analysis may not be forthcoming on these approved exercises; therefore, the program end date will remain flexible. A chronological list of the currently approved exercises is as follows:

<u>EXERCISE</u>	<u>SPONSOR</u>	<u>LOCATION</u>	<u>DATE</u>
GALLANT CREW 74	USREDCOM	FORT BLISS, TX	15-22 FEB 74
EXPRESS CHARGER	FMFLANT	CAMP LEJEUNE, NC	JUN/JUL 74
BRAVE SHIELD IX	USREDCOM	FORT POLK, LA	22 JUL-8 AUG 74
REFORGER 74*	USEUCOM	GERMANY	OCT/NOV 74
CARAVAN III	USEUCOM	GERMANY	JAN 75
GALLANT EAGLE*	USREDCOM	CAMP IRWIN, CA	FEB 75
AGATE PUNCH	CINCLANTFLT	CAMP LEJEUNE, NC	MAR/APR 75
SOLID SHIELD 75*	LANTCOM	CAMP LEJEUNE, NC	MAY/JUN 75

*RMS Instrumentation

5. Tasking. Highlights of OSD/ JCS tasking of the primary organizations/ commands involved in the CAS validation effort are as follows:

- a. Director, Defense Research & Engineering (DDR&E).
 - (1) Review and approve the Detailed Test Plan prior to implementation.
 - (2) Provide funding for instrumentation, data collection, data reduction, etc., as required.
 - (3) Prioritize RMS scheduling for selected exercises.
- b. Joint Chiefs of Staff (JCS). Approve the DTP and forward to OSD(DDR&E).
- c. Director, Weapons System Evaluation Group (WSEG).
 - (1) Monitor data collection and data reduction.
 - (2) Accomplish an independent analysis and report.
 - (3) Provide reports in accordance with JCS tasking as amplified in Annex E.
- d. Unified Commands/Services.
 - (1) Provide required support for the Joint CAS Validation Headquarters.
 - (2) Assist the Joint CAS Validation Headquarters in refining CAS validation cost estimates contained in this plan.
 - (3) Submit to the Joint CAS Validation Headquarters a Detailed Individual Test Plan for each selected exercises under their cognizance 60 days prior to the start of the exercise.
 - (4) Provide required support for the Request Phase Team, Execution Phase Team and Analysis Team.
 - (5) Provide data collectors for each selected exercise (sponsoring command).
 - (6) Provide weather observation support during selected exercises.
 - (7) During the execution of each exercise, make working records such as logs, journals, CAS request forms, status reports, message hard copies, and debriefing reports available to the data collectors on a non-interference basis for extraction of CAS backup data as required.
 - (8) Provide subjective comments on specific exercises when requested.
 - (9) Provide recommended changes to data collection forms.
 - (10) Provide data from OT&E programs that relate to CAS test objectives as requested.
- e. USCINCRD. In coordination with CINCLANT:
 - (1) Establish the Joint CAS Validation Headquarters, Request Phase Team, Execution Phase Team and Operations Analysis Team.
 - (2) Conduct a Data Collectors' School in the exercise area prior to each exercise in the time frame requested by the sponsoring command.
 - (3) Supervise data collection.
 - (4) Develop procedures for and accomplish data reduction.
 - (5) Develop procedures for and accomplish data analysis.

(6) Provide reduced data developed from each exercise to the appropriate Service/Command and to WSEG.

(7) Provide a VRS and supporting personnel.

(8) For designated exercises, arrange for RMS-2 equipment, siting and support personnel.

(9) Provide reports in accordance with Annex E.

6. Data Collection Methods.

a. Proper use by data collectors of the forms included in Annex C will provide the minimum data required.

b. A VRS is required on all exercises to provide assistance/backup to the manual data collection. Two ten-channel systems properly positioned will provide adequate coverage in the majority of the exercises. VRS requirements and positioning must be thoroughly outlined in the Detailed Individual Test Plan submitted by the sponsoring command 60 days prior to each exercise.

c. The RMS-2 is recommended for use on three exercises, one from each of the participating unified commands: REFORGER (USEUCOM), GALLANT EAGLE (USREDCOM), and SOLID SHIELD II (LANTCOM). Forty additional RMS responder ("B" Units) are required to insure that sufficient data is obtained during these three exercises. The RMS must be prioritized and scheduled by DDR&E.

7. Costs. The piggybacking of CAS validation on the existing exercise program will greatly decrease the overall cost. Preliminary estimates of costs directly attributable to the validation effort are contained in Annex D.

CHAPTER I INTRODUCTION

1. Purpose. The purpose of the Detailed Test Plan (DTP) is to outline the procedures and methodologies for conduct of the Close Air Support (CAS) validation program and for collection and analysis of the data required to validate the CAS objectives (Annex F) which will reduce the uncertainties concerning CAS command and control. These uncertainties were identified in the Joint Staff Task Force (JSTF) CAS Study Phase II Report. The DTP entails ultimate integration into one document the Individual Test Plans (ITP's) prepared by each participating Unified Command. Maximum data coverage of the CAS objectives is the ultimate goal. Individual Test Plans per se are not included in the DTP due to the paucity of information on time frames of nominated exercises, forces involved and funding. This plan contains general guidance to commanders who are tasked to develop DITP's. The guidance will insure detailed coverage of the objectives in subsequent planning documents. It must be particularly noted that the primary focus of the exercise program is on the functions of command and control for CAS rather than on CAS aircraft.

2. Background.

a. During calendar year 1972 a JSTF performed a CAS Phase II Study. This Study concentrated on two functional areas which impact upon the effectiveness with which the CAS mission is accomplished: command and control, and basing and logistics.

b. As a consequence of the CAS Phase II Study, the Deputy Secretary of Defense stated in a 24 January 1973 letter to Senator Stennis that: "Selected field tests and joint training exercises will be conducted for the purpose of collecting empirical data on CAS command and control. The overall objectives of the tests and exercises will be to verify command and control criteria and to measure, quantitatively, Service CAS command and control systems by these criteria, such as response time, fire support coordination, and capacity. These tests are expected to surface areas for improvement in current systems" The CAS Phase II JSTF Executive Summary was attached to the 24 January 1973 letter to Senator Stennis, along with a set of conclusions and recommendations developed by the Review Group. One of the recommendations was: "Prior to further study of CAS, comprehensive field tests, data collection efforts and evaluations be conducted to provide realistic results designed to reduce the areas of uncertainties in the qualitative and quantitative analyses of the study."

c. In furtherance of his commitment to the Chairman of the Senate Armed Services Committee, the Deputy Secretary of Defense, in a memorandum dated 24 January 1973, tasked the Chairman, Joint Chiefs of Staff (JCJS) to develop and direct the implementation of a DTP to achieve specific test objectives designed to reduce the areas of uncertainty concerning command and control aspects of that study. The memorandum also tasked the Director of Defense Research and Engineering (DDR&E) to provide guidance and monitor the development of the DTP prior to implementation.

d. Subsequently, the Joint Chiefs of Staff (JCS) tasked the Weapons System Evaluation Group (WSEG) to participate in the planning necessary for development of a DTP. Specifically, WSEG, with the assistance of USREDCOM and LANTCOM and the Services as required, was tasked to develop a Data Collection Plan (DCP) to obtain the empirical data necessary to reduce the areas of uncertainty in the qualitative and quantitative analyses of the CAS Phase II Study. The DCP was submitted and briefed to the JCS on 1 June 1973.

e. The JCS also provided guidance that the planning for the program should be focused on collecting the required data within scheduled Service and joint tests and exercises. This procedure was considered desirable because of the considerable savings which would result therefrom. However, the JCS recognized that the tests and exercises selected might have to be

modified for this purpose and, further, that some dedicated tests and exercises (and additional funding) could be required.

f. Following JCS approval of the DCP on 26 June 1973, and in response to previous JCS tasking, USREDCOM, in coordination with LANTCOM and assisted by WSEG, completed the development of a Test Plan Concept (TPC) on 27 July 1973. The purpose of the TPC was to determine the procedures and methodology for the application of the DCP to tests/exercises and to nominate tests/exercises for the data collection effort. The TPC was submitted and briefed to the JCS on 31 July 1973.

g. The JCS, on 4 September 1973, approved the TPC for use in developing the DTP and provided additional guidance for the application of the DTP to the exercise program. Specifically, USREDCOM, in coordination with LANTCOM, was assigned responsibility for the collection, reduction, and validation of data and the analysis and report of the results of the execution of the DTP.

h. In the same message, WSEG was tasked to monitor the data collection and reduction, perform an independent analysis and to forward the report to the JCS with copies to USREDCOM for use as appropriate in developing the final report to the JCS. Additional guidance and rationale for some of the modifications made in the TPC were included in JCSCM 398-73, 4 September 1973, as follows: "The central issue . . . is the problem of achieving the objectives in joint training and test exercises. The memorandum by the Deputy Secretary of Defense, dated 24 Jan 73, directed ' . . . the implementation of the DTP in joint training and test exercises'." Data shortfall in this environment was anticipated and, in response to guidance by the JCS, the TPC proposed alternate sources of data collection to achieve the test objectives.

i. The planning phase of the CAS validation effort attempts to validate the objectives as completely as possible with empirical data from scheduled joint exercises expanded, as appropriate, by command post exercises and field simulations. Subjective comments provided by the Services and Commanders of Unified Commands will be used to address the test objectives. Department of Defense/Service programs, and combat data may also prove useful in expanding or supplementing data collected from the field exercise environment and will be reported. All of these sources should combine to produce the best product.

3. Scope.

a. The objectives to be validated are extremely broad in scope. These objectives, along with the specific guidance for each test objective contained in JCSCM 223-73 and the subsequent guidance contained in JCS 306-73, outline a task even broader in scope. If an attempt were made to investigate all the possibilities and combinations and all the variables encompassed by the JCS guidance, the volume of data collected would be so massive that it would be difficult to process and analyze.

b. In addition, there are a number of facets of the problem that do not lend themselves to quantitative measurement or are not practicable for collection in a non-combat environment. In particular, some of the objectives do not lend themselves to collecting valid data at all nodes or in all phases of the command and control systems for CAS.

c. This plan, therefore, identifies those objectives and areas in which valid data can be collected during the proposed exercise program and those which can only be addressed partially.

d. This plan emphasizes collection of data during field exercises planned to be conducted during FY 74-75. Data used for validation of CAS Phase II Results will, to the maximum extent possible, be collected during the maneuver phase of an exercise. Command Post Exercises will be used to add realism to command and control for CAS (e.g., to represent adjacent units or to load the Direct Air Support Center (DASC) with traffic from non-participating units). Realism will be emphasized; simulations and artificialities will be minimized.

e. In accordance with the general guidance of the JCS contained in JCSM 223-73 and as previously stated, the primary focus of the test activities will be on the functions of command and control for CAS and not on CAS aircraft. The testing is designed to ascertain the capability of the command and control systems for CAS to effect the necessary integration and provide the most effective CAS attacks.

f. As outlined by the JCS, the plan reflects current and anticipated resource constraints. The scope of test activities, means of data development, and methods of data collection are based on a realistic assessment of these constraints. This plan has as a principal objective not to commit the test director, the Services, or the data collectors and evaluators to an overly optimistic data collection effort.

g. In furtherance of the JCS general guidance, the plan concentrates on command and control of CAS. Its addressal of other functional areas, such as communications, intelligence and operations, is limited to those which directly and substantively affect command and control of CAS.

h. The following is a listing of the objectives along with the rationale used in scoping the data collection and analysis effort in each of the phases of the CAS Phase II Validation command and control exercise program.

<u>JCS TEST OBJECTIVES</u>	<u>REQUEST PHASE*</u>	<u>EXECUTION PHASE**</u>
1. Response Times	Collect data from exercises in both phases of command and control of CAS.	
2. Determination of Communications Required	Collect data on delays or aborts due to communications breakdown or saturation at each node of the command and control network for CAS.	
3. Determination of Capacity to Integrate CAS with FSCC, Air Defense and Airspace Control	Collect valid data on fire support coordination, air defense coordination or airspace control in peacetime/non-combat environment.	
4. Maximum Capacity to Handle Attacks Under Clear Weather Conditions	Collect data (CPX may be required at appropriate node)	Collect data primarily in target area (CPX may be required)
5. Training Requirements	JCS has directed the Services to address this objective.	
6. Degradation Due to Night, Bad Weather or Reduced Visibility	Peacetime limitations - (Flying safety, airline operations, etc.) may limit data collection in request/execution phases. However, some data can be collected. Weather conditions can be simulated.	
7. CAS Target Acquisition Systems Ability to Detect and Hand Off Targets	N/A	Practicable in target area.
8. Determination of Extent of System Degradation From Damage to Individual Elements	Amenable to collection in request phase by scenario and system outage (e.g., DASC knocked out as result of attack).	Feasible by scenario control and system outages (e.g., FAC(A) shot down).

<u>JCS TEST OBJECTIVES</u>	<u>REQUEST PHASE*</u>	<u>EXECUTION PHASE**</u>
9. Intelligence Info and Friendly Data Applicability as Aids to Decision-Making	Subjective comments apply.	Can measure target location and friendly force location impact on CAS.
10. Determination of Compatibility and Interoperability	Qualitative data can be collected.	Compatibility and interoperability will be recorded in target area.
11. Evaluation of Improvements Offered by New/Improved Equipment	Amenable to collection in request phase throughout entire plan as new equipment is introduced.	Valid data can be secured in target area.

* Request Phase. The CAS request process commences upon decision at the Battalion CP/TACP to request CAS. The Request Phase additionally includes those actions required at the Regiment/Brigade CP/TOC/TACP; the Division CP/TOC/TACP; the Marine Amphibious Force CP/Army Corps TOC/DASC; the Field Army TOC/TACC; the Marine Corps DASC (and TACC if required); and the Navy SACC/TACC, from receipt of the request until acknowledgement of the order to execute by the pilot/flight leader.

** Execution Phase. The Execution Phase commences upon receipt of the order to proceed by the pilot/flight leader, includes the actions within the enroute control agencies, and terminates in the target area upon completion of the attack/reattack on single or multiple targets.

CHAPTER II

PLAN OF ANALYSIS FOR THE EXERCISE PROGRAM

1. Purpose and Scope.

a. Purpose. This chapter establishes requirements for the plan of analysis for CAS command and control validation results. Its purpose is to specify a test design for the validation program, requirements for data analysis and reduction, and the presentation of program results. An intimate relationship exists between test design, method of analysis and data reduction procedures. The dominating factor is the test design because of constraints imposed by availability of suitable exercises and exercise operational conditions, and the JCS requirement that the CAS Validation Program will cause minimum interference with selected exercises.

b. Scope.

(1) The plan of analysis will emphasize analysis of quantitative CAS data collected during exercises. Data collectors will collect qualitative information from participants during or immediately following each exercise as required. This information may be used as an aid in the analysis of quantitative data. Use of information and data from other sources (Service tests, combat data, and subjective comments) is addressed in Chapter III.

(2) The three existing Service systems for command and control are complementary rather than competitive. Therefore, no attempt will be made to compare or evaluate the command and control system effectiveness among the Services. In addition, Service roles and missions or comparison of CAS doctrines, tactics, and procedures will not be addressed or analyzed.

2. Concept of Analysis.

a. The major categories of factors essential to the development of a concept of analysis are:

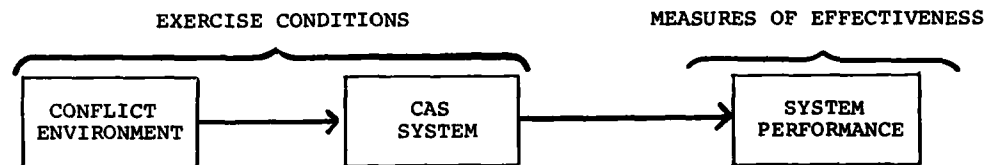
- (1) Measures of effectiveness.
- (2) CAS systems, with emphasis on command and control.
- (3) Conflict environments (i.e., operational and environmental conditions).

b. For purposes of analysis, a CAS system is defined as that part of a Service command and control network that applies to CAS activity to include all equipments, doctrine, tactics, and procedures. The three networks are illustrated in Chapter IV, Figures 4-2 through 4-4, inclusive.

c. The above categories of factors are related and the causal relationship among them may be illustrated as shown in Figure 2-1. The postulated relationships indicate that conflict environments affect, to some degree, the CAS systems which in turn affects system performance. Also, variations in system conditions (e.g., damaged elements, etc.) will, within themselves, affect system performance.

d. The measures of effectiveness stated in the DCP for assessing the performance of CAS systems are immediate CAS mission response time and success or failure to perform essential functions. It follows that Objective 1 (Determination of response times for immediate demands) is a stated measure of effectiveness.

e. The other objectives refer to operational, environmental and CAS system conditions that must persist during some given portion of an exercise in order to provide valid data for analysis.



CAUSAL RELATIONSHIPS

FIGURE 2-1

f. The relationships among objectives, conditions, and measures of effectiveness illustrated in Figure 2-1 resulted in the following general concept for development of a plan of analysis. The general concept is to determine immediate CAS mission response times and success or failure as a function of combinations of operational, environmental, and CAS system conditions. This means that Objectives 2 through 11 will be evaluated with respect to Objective 1 (Determination of response times).

g. Because of limitations on the number of exercises available for the collection of CAS data, it is not possible to evaluate CAS objectives for all possible combinations of operational, environmental and CAS system conditions. In addition, guidance from JCS states that the CAS validation program should not detract from exercise training objectives. These considerations limit the number of combinations of conditions that can be evaluated in the CAS Validation Program.

h. In consideration of the above constraints, the approach employed in developing a plan of analysis is as follows:

(1) Identification of the minimum number of operational, environmental, and CAS system conditions required to satisfy objectives.

(2) Establishment of a base case in accordance with the guidance provided in the TPC.

(3) Identification of deviations from base case conditions required to satisfy objectives.

(4) Establishment of a test design and sampling plan.

(5) Estimation of sample size requirements.

(6) For each Service, allocation of base case conditions to selected exercises and estimated availability of CAS missions.

i. To the extent exercise design permits, a degree of influence on exercise scenario preparation and execution may be required to insure that the allocation of base case and deviations from base case conditions are in accordance with a specified test design. The degree of influence required should not detract from training objectives. Allocations of conditions that may detract from training objectives should be known at least 60 days prior to the conduct of the exercise and reallocations would be made by the Validation Headquarters, as required.

j. Some degree of control is required in the CAS validation program to insure that an adequate sample size of mission related data as a function of exercise conditions is available for analysis, and to establish quantitative data analysis procedures before the fact rather than after. Detailed analysis procedures will be published as an addendum to the DTP.

3. Test Design.

a. General.

(1) This section establishes a set of base case conditions and deviations from base case conditions. Also, the relationships between objectives and operational, environmental and CAS system conditions are given. These relationships are required:

(a) To determine which objectives can be satisfied in a given exercise and under what conditions.

(b) For guidance in scenario development to insure an adequate sample size of mission related data can be provided for statistical analysis.

(2) Each objective is related to one or more of the other objectives. Thus, it is not realistic to address each objective independent of others in scenario development. What must be considered are the combinations of exercise conditions which will produce data related to one or more objectives.

b. Base Case Conditions.

(1) The key in test design and data analysis is the specification of base case conditions in accordance with the requirements stated in the TPC. The base case provides a framework for data collection and for determination of the effects of changes in exercise conditions on system performance.

(2) The base case conditions are defined as a set of conditions which will neither improve nor degrade the performance of current doctrinely approved Service CAS systems.

(3) The following base case conditions derived from objectives are as follows:

- (a) Daylight conditions.
- (b) Good weather/visibility.
- (c) No damage to CAS elements.
- (d) No secure voice.
- (e) Standard equipment.
- (f) Limited enemy air threat.
- (g) Limited enemy air defense threat.
- (h) Target poor environment.
- (i) No interface with other systems.
- (j) No electronic counter measure threat.
- (k) Adequate intelligence.

(4) Deviations from base case conditions required to satisfy objectives are as follows:

- (a) Night.
- (b) Reduced weather/visibility.
- (c) Damaged CAS system elements.
- (d) Secure voice.
- (e) New equipment.
- (f) Substantial enemy air threat.
- (g) Substantial enemy air defense threat.
- (h) Target rich environment.
- (i) System interface.

(j) Electronic counter measure threat.

(k) Inadequate intelligence.

c. Objectives Versus Exercise Conditions.

(1) Deviations from the base case could occur in a large number of combinations. For example, only one condition at a time could differ from the base case, or combinations of two or more conditions could simultaneously differ from the base case during an exercise. It is clear that it is not feasible to conduct a series of exercises to account for all possible combinations of deviations from the base case.

(2) One approach to the reduction of combinations of conditions from the base case is to consider only single condition deviations. This approach would minimize the complexity of exercise scenarios and simplify analysis of exercise results. This test design is indicated in Table 2-1. This table indicates that if base case conditions exist during some given time period during an exercise, then data would be generated to address objectives 1, 2, 3, 7 and 10. Likewise, if data is collected during night operations and all other conditions are as specified in the base case, then data would be generated to address Objectives 1, 2, 3, 6, 7 and 10. Asterisked conditions indicate the specific exercise conditions required to satisfy given objectives. For example, night operations and reduced weather/visibility are required to satisfy objective 6. By examination of the conditions associated with an exercise scenario, or by influencing an exercise scenario to satisfy specified conditions, the objectives then can be validated by the exercise -- this can be determined by use of Table 2-1.

d. Sampling Plan. For the test design shown in Table 2-1, it is not possible to obtain sufficient mission related data for all paths in the Service networks, and for all objectives. A sampling plan is as follows.

(1) For base case conditions, obtain mission related data for all aircraft sources (alert postures).

(2) For deviations from the base case, key the sampling plan to deviated conditions (i.e., generate 10 CAS requests during conditions of reduced weather/visibility). The aircraft sources employed would be governed by exercise conditions and doctrine.

4. Data Analysis and Presentation of Exercise Program Results.

a. General. This section presents the approach to be employed to respond to objectives and the method of presentation of quantitative exercise program results. Procedures for data analysis and presentation of exercise results are dictated by four general requirements: the objectives, test design, sampling plan and formats utilized for presentation of data contained in the CAS Phase II Study. Implementation of the approach outlined in this section is predicated on the existence of a test design and sampling plan that corresponds to the concepts stated in previous sections. Implementation will also require the development of appropriate statistical models. In addition, the test design, sampling plan, and sample size requirements should be expanded upon in the Detailed Analysis Plan. This task will be accomplished as soon as possible by the Validation Headquarters.

b. Data Analysis Phases. The analysis of exercise data will be conducted in two phases. The first phase addresses the analysis of data for fixed sets of exercise conditions (i.e., base case conditions, night operations, etc.). This analysis will determine response times, success or failure to perform essential functions, and other statistics as a function of alert posture, exercise conditions and other relevant description parameters. The second phase will consist of comparisons of response times and failure to perform essential functions for the base case and deviations from the base case. An example would be a comparison of response times for base case conditions and night operations as a function of alert posture.

TEST OBJECTIVES EXERCISE CONDITIONS	1	2	3	4	5	6	7	8	9	10	11
Base Case	X*	X	X				X			X	
Night	X	X	X			X*	X			X	
Reduced WX/VIS	X	X	X			X*	X			X	
Damaged Elements	X	X	X				X	X*		X	
Secure Voice	X	X*	X				X			X	
New Equipment	X	X	X				X			X	X*
Air Threat	X	X	X*				X		X	X	
AAW Threat	X	X	X*				X		X	X	
Target Rich	X	X	X	X*			X		X	X	
System Interface	X	X	X				X			X*	
ECM Threat	X	X*	X				X			X	
Inadequate Intelligence	X	X	X				X		X*	X	

*Conditions required to satisfy given Test Objectives.

TEST OBJECTIVES VERSUS EXERCISE CONDITIONS

TABLE 2-1

c. Analysis Within Exercise Conditions. Analysis of CAS mission related data within exercise conditions will consist of response times and failure to perform essential functions as a function of the exercise conditions described in the section on test design. To illustrate the presentation of exercise results consider the base case and sampling plan described in the previous section. The exercise results will be presented in two forms. One form of presentation is illustrated in Figure 2-2. This figure illustrates the percentage of missions completed in less than or equal to some given time "t" as a function of alert posture. These curves can then be compared to the Phase II CAS Results for immediate CAS mission times. In order to depict the effects of delays, mission times will be presented as illustrated in Figure 2-3. Tabular formats will also be utilized to present exercise results as indicated in Table 2-2. For the base case, this type of format will be utilized to compare response times for CAS system links with those contained in the Phase II Study.

d. Analysis Between Exercise Conditions. In order to address CAS objectives, system performance for the base case will be compared with that associated with deviations from the base case. Again response time curves will be presented along with measures of minimum mean and maximum times as illustrated in the previous section. For purposes of illustration, the effects of ECM on response times (Objective 2) would be as presented in Figure 2-4. This procedure would be applied to obtain results for all CAS objectives.

5. Data Reduction.

a. Data Sources.

(1) The data collected for reduction will be obtained from several field training exercises as described in Chapter III. Data will be collected at key points or nodes within the command and control networks in each exercise (see Chapter IV). Trained data collectors will observe the exercise play at their nodes and record the required data on specially prepared data collection forms. These forms will be the primary input for data reduction.

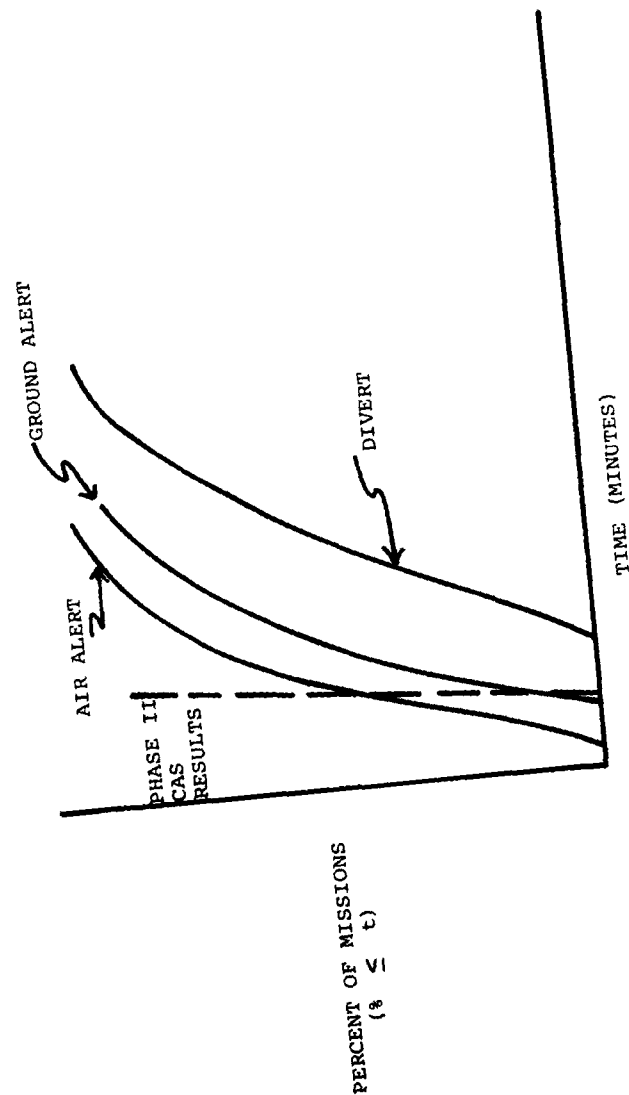
(2) Supplementary to the manual data collection forms will be the VRS. This system records radio/wire transmissions from multiple selected channels. Transmissions are recorded simultaneously on multi-channel tape. They are accompanied by a synchronous time signal which provides the precise time of each transmission. Contractor personnel assigned to the Data Reduction Agency (see Chapter IV) will decode the VRS tapes and provide worksheets of chronological CAS events to be correlated with the manually collected data.

(3) On selected exercises, a supplemental source will be the RMS-2. This system collects data from which the three dimensional position (x-y-z) coordinates of selected exercise participants can be precisely calculated for any given time. Contractor personnel assigned to the Data Reduction Team will interpret the computer printouts of the RMS-2, extract appropriate information, and calculate the position of selected ground and airborne participants in the target area. This calculated data will be correlated with the manually collected and VRS data for application to CAS objectives.

(4) Other supplemental data may be obtained from the player unit working records when primary data is insufficient or unobtainable.

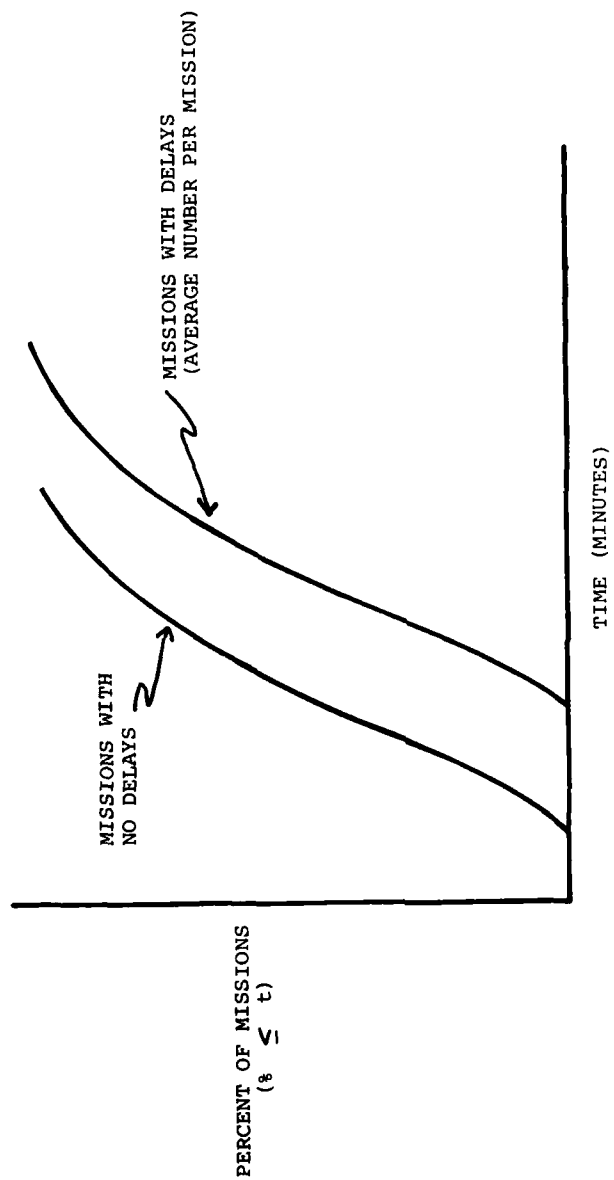
6. Data Processing.

a. Data processing will be accomplished by the Validation Headquarters augmented by contractor personnel. General data flow through the reduction process is shown in Figure 2-5. The data processing/reduction work program will begin with the debriefing of the data pickup teams and the initial sorting/review/tabulation of the exercise data. The input data will be manually transferred to data reduction worksheets designed to group comparable data. This grouped data will be reviewed by the Validation Headquarters for completeness and then posted to preliminary (initial) spreadsheets which reconstruct the history of an individual CAS mission.



EFFECTS OF ALERT POSTURE (EXAMPLE)

FIGURE 2-2



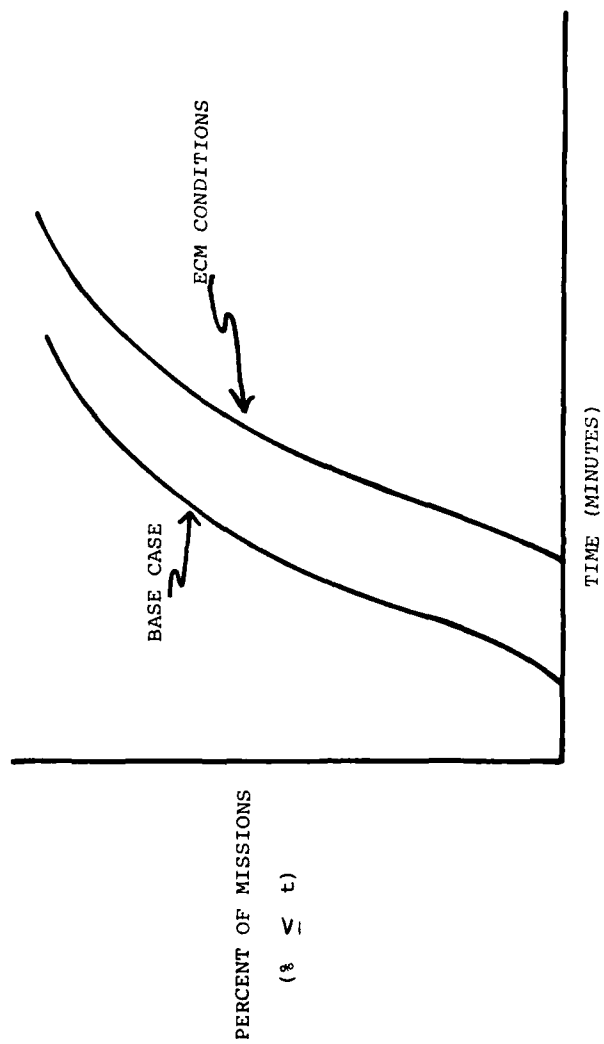
EFFECTS OF DELAYS (EXAMPLE)

FIGURE 2-3

ALERT POSTURE	MINIMUM TIME	MEAN TIME	MAXIMUM TIME
Air Alert	5	25	45
Ground Alert	10	41	90
Divert	15	47	92

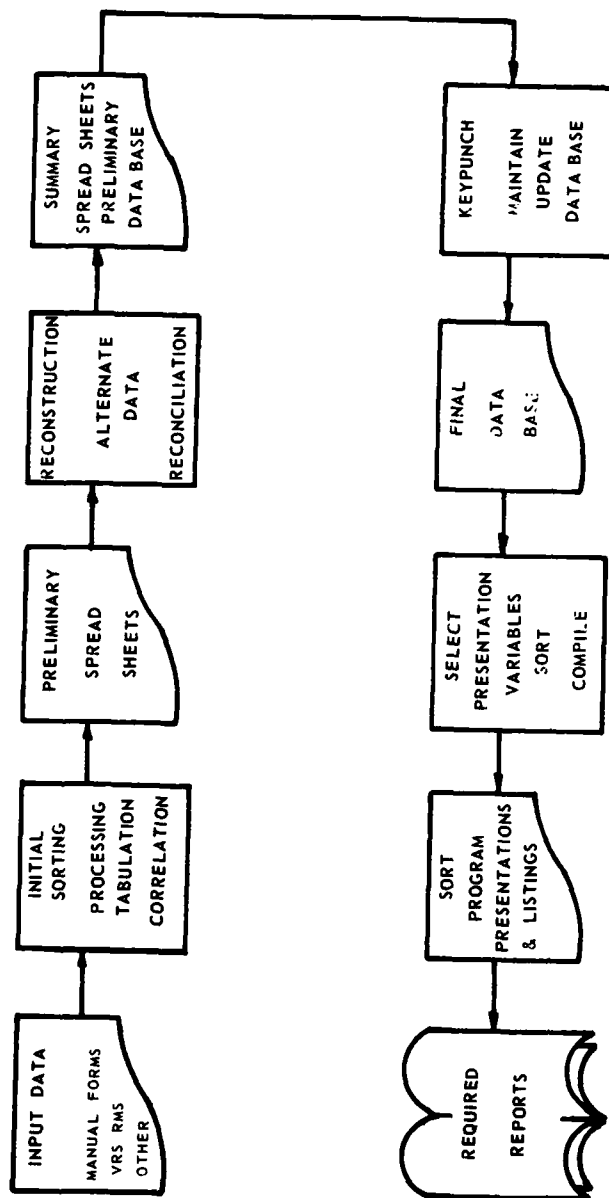
RESPONSE TIME RELATED TO AIRCRAFT SOURCES (EXAMPLE)

TABLE 2-2



EFFECTS OF ECM (EXAMPLE)

FIGURE 2-4



DATA FLOW/WORK TASKS

FIGURE 2-5

b. When the preliminary spreadsheets have been prepared, the data will be further reviewed for omissions, inconsistencies, gross errors, and transpositions. When problems occur that cannot be reconciled by inspection, or data is missing, the data reducers will request additional backup data. Data collectors in the field will debrief exercise players and obtain copies of applicable player unit records as required.

c. After the reconstruction and reconciliation of individual missions, a smooth summary type (final) worksheet will be prepared. The final spreadsheet will be in the same general format as the preliminary spreadsheet; however, each line will represent a different mission. The total entries present a running history of all CAS missions. An example of the summary/spreadsheet is shown in Figure 2-6. The single entry for each time transferred from the preliminary spreadsheet is based on a reconciliation of the data and an explanation/rationale for all time selections in that phase of the work program.

d. The final spreadsheets comprise the preliminary data base which will be used later for keypunching, sorting and selecting specific data for analysis. This data base will be expanded as the data reduction of daily missions of each exercise progresses.

7. Data Presentation.

a. After each exercise is completed, the preliminary data base of reconstructed CAS missions will be keypunched to form the final data base for sorting, data presentation, and analysis. This final data base will be maintained and updated after each exercise.

b. A sort program will be developed for the Validation Headquarters by the data reduction contractor to be used to sort and present the data. The data can be items such as node of operation, type aircraft used, time period of interest, type of target, operational conditions, environmental conditions, baseline conditions, specified event on one exercise, specified event on all exercises (cumulative), or specified event by Service. Examples of possible data presentations are shown in Figures 2-7, 2-8, and 2-9. Listings can be by exercise, date, mission number, etc. In addition, key data items such as minimum and maximum times used to complete a mission and calculations of the average mission time and the standard deviation can be calculated and presented as shown in Figure 2-8. The program will present data in the form required by the Detailed Analysis Plan.

c. The data maintained in the final data base and compiled by the sort program will be used or presented in the applicable reports required by Annex E.

EXAMPLE
SUMMARY SPREAD SHEET FOR
CAS ELAPSED TIME DATA

REQUEST PHASE

EXERCISE QUANTIFIER III DATE 12 Jul 71

Request Number	TIME Initial Request Received	CAS Decision	Decision Unit	Process	Comm		Process	Comm		Process	Comm		Request		Stop Auth		Stop Auth		Mission		Tasked Unit	Unit Mission Number	Total Request Time
					TX - Ack	DASC/DASC		TX - Ack	DASC/DASC		TX - Ack	DASC/DASC	Short Stop	Request	Stop Auth	Stop Auth	Stop Auth	Stop Auth	TX - Ack	Alert			
PAP 01	0311	2	3/73 Bn	1	2	2	2	2	2	2	2	2	3	3	2	2	2	2	1	Ground	926 TFS	1209-1	15
PAQ 03	0423	2	1/16 Bn	2	3	1	1	3	1	3	3	3	4	4	2	2	2	2	2	Divert	926 TFS	1209-2	16
FBT 02	0457	1	2/24 Bn	2	2	1	1	3	1	3	3	3	2	2	2	2	2	2	1	Ground	857 TFS	1209-1	15
FBJ 05	0731	2	2/35 Bn	3	5	2	2	3	2	3	3	4	4	4	2	2	2	2	1	Air	857 TFS	1209-2	22
FAS 07	0809	1	4/16 Bn	1	3	3	3	2	2	1	3	3	3	3	2	2	2	2	2	Air	926 TFS	1209-4	16
FCU 09	0917	3	3/82 BDE	2	4	2	2	3	2	2	3	3	3	3	2	2	2	2	1	Divert	837 TFS	1209-7	20
FAQ 07	1014	3	1/16 Bn	1	5	2	2	2	2	1	2	2	2	5	2	2	2	2	2	Ground	926 TFS	1209-5	18
FBN 11	1136	2	2/37 Bn	1	3	1	1	(2)	1	1	3	3	5	5	2	2	2	2	1	Div Gnd	3 Btk	1209-5	17
																				Div Gnd	Held Col LIB	2-7	

NOTE: This figure is for demonstration only. All information contained herein is fictitious, but representative.

FIGURE 2-6

EXERCISE	DATE	REQ #	TIME IN	TIME OUT	TIME
1	2-21-74	14	0805	0817	12
1	2-21-74	17	0913	0916	3

CAS VALIDATION SORT PROGRAM (EXAMPLE)
 SORT CONDITIONS: TACC TIMES - HELICOPTER MISSIONS - NO ECM - DAY ONLY

FIGURE 2-7

EXERCISE	DATE	REQ #	MISSION	TRANSIT TIME	TOTAL TIME
2	7-23-74	2	2	9.5	17.3
2	7-23-74	7	9	6.0	30.0

MEAN MISSION TIME: 23.5
 ST DEVIATION: 7.0
 MAXIMUM 38.6
 MINIMUM 11.0

CAS VALIDATION SORT PROGRAM (EXAMPLE)
 SORT CONDITIONS: TOTAL MISSION TIME - BASE CASE - ARMY/AIR FORCE - BRAVE SHIELD IX

FIGURE 2-8

MISSION ID NO.	TAR FORM COMPLETED	TACP TRANSMITS REQUEST TO DASC	DECISION MADE AT DASC	DASC TRANSMITS TO TACC	DECISION MADE AT TACC	TACC TRANSMITS TO TUOC	PILOT NOTIFIED
1014	2.2	3.1	4.1	2.1	5.5	2.5	4.1
1056	2.6	3.4	4.6	2.5	4.1	2.1	4.9
1143	2.5	2.9	4.9	2.9	3.3	2.3	4.7

SORT CONDITIONS: TIME REQUIRED FOR ACTIVITIES THROUGH NODES (EXAMPLE)
F-4 SORTIES - SOLID SHIELD 75

FIGURE 2-9

CHAPTER III
EXERCISE PROGRAM

1. General. The purpose of this chapter is to review and examine the selected exercises which will be used in validating the CAS Phase II Study. An analysis of coverage will delineate the degree of difficulty in addressing the objectives and discuss how environmental and operational factors may affect the validation effort. This will include the determination of the degree to which specific exercises can provide data for each of the CAS objectives. Finally, supplemental sources will be considered and recommendations made which may assist in satisfying the objectives.

2. Review of Selected Exercises. Information is provided on each of the exercises approved by the JCS for Validation of the CAS Phase II Study Results. Figure 3-1 is an overview of the selected exercises and the dates they are to be conducted.

a. Exercise GALLANT CREW 74.

(1) Dates: The exercise is currently scheduled to be conducted during the period 15-22 February 1974.

(2) Location: In the Fort Bliss, Texas area with airspace including a portion of the White Sands Missile Range.

(3) Sponsoring Command: U.S. Readiness Command.

(4) Type Exercise: A JCS directed, medium scale, joint Army and Air Force training exercise.

(5) Instrumentation: The primary means of collecting data and information from this exercise will be through the use of approved manual data collection forms. A Voice Recording System (VRS) will be used to confirm, when required, the data recorded on the forms and as a backup system in case the data collectors are not able to record some essential data elements.

b. Exercise EXPRESS CHARGER.

(1) Dates: The exercise is tentatively scheduled to be conducted during June/July 1974. Specific dates have not yet been determined.

(2) Location: In the Camp Lejeune, North Carolina area.

(3) Sponsoring Command: Fleet Marine Forces, Atlantic.

(4) Type Exercise: U.S. Marine Corps unilateral medium scale training exercise.

(5) Instrumentation: The primary means of collecting data and information will be through the use of JCS approved data collection forms. A VRS will be used to confirm, when required, the data recorded on the forms and as a backup system in case the data collectors are not able to record some essential data elements.

c. Exercise BRAVE SHIELD IX.

(1) Dates: The exercise is tentatively scheduled to be conducted during the period 22 July to 8 August 1974.

(2) Location: In the Fort Polk, Louisiana complex.

(3) Sponsoring Command: U. S. Readiness Command.

(4) Type Exercise: A JCS directed, medium scale, joint Army and Air Force training exercise.

PLANNED CAS EXERCISES

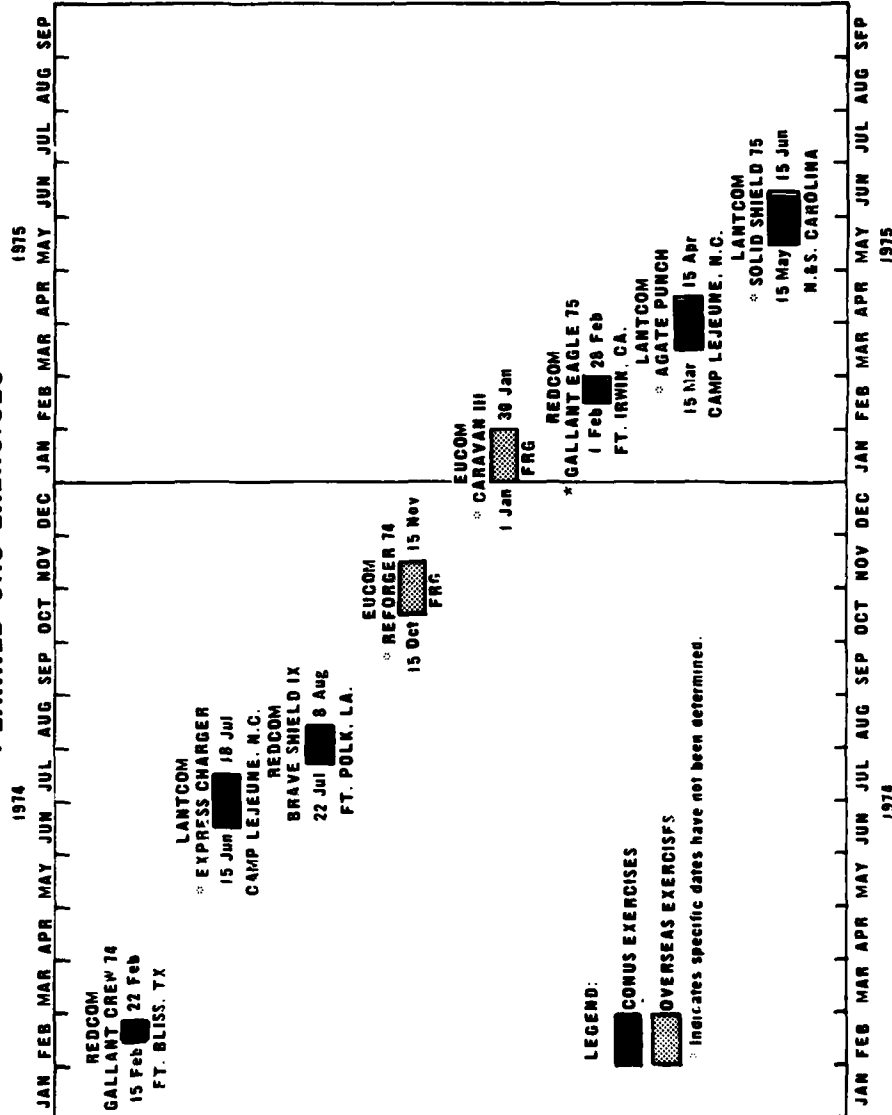


Figure 3-1 CAS Validation Exercises and Scheduled Dates

(5) Instrumentation: The primary means of collecting data and information will be through the use of JCS approved data collection forms. A VRS will be used to confirm, when required, the data recorded on the forms and as a backup system in case the data collectors are not able to record some essential data elements.

d. Exercise REFORGER 74.

(1) Dates: The exercise is tentatively scheduled to be conducted during October/November 1974. Specific dates have not been determined.

(2) Location: In the Federal Republic of Germany.

(3) Sponsoring Command: U.S. European Command.

(4) Type Exercise: A medium scale, joint Army and Air Force training exercise.

(5) Instrumentation: The primary means of collecting data and information will be through the use of JCS approved data collection forms. A VRS will be used to confirm, when required, the data recorded on the forms and as a backup system in case the data collectors are not able to record some essential data elements. The RMS will be used to collect data in the target area.

e. Exercise CARAVAN III.

(1) Dates: The exercise is tentatively scheduled to be conducted during January 1975. Specific dates have not yet been determined.

(2) Location: In the Federal Republic of Germany.

(3) Sponsoring Command: U.S. European Command.

(4) Type Exercise: A small scale, joint Army and Air Force training exercise.

(5) Instrumentation: The primary means of collecting data and information will be through the use of JCS approved data collection forms. A VRS will be used to confirm, when required, the data recorded on the forms and as a backup system in case the data collectors are not able to record some essential data elements.

f. Exercise GALLANT EAGLE 75.

(1) Dates: The exercise is tentatively scheduled to be conducted during February 1975. Specific dates have not yet been determined.

(2) Location: In the Fort Irwin, California complex.

(3) Sponsoring Command: U.S. Readiness Command.

(4) Type Exercise: A large scale, joint Army and Air Force training exercise.

(5) Instrumentation: The primary means of collecting data and information will be through the use of JCS approved data collection forms. A VRS will be used to confirm, when required, the data recorded on the forms and as a backup system in case the data collectors are not able to record some essential data elements. The RMS will be used to collect data in the target area.

g. Exercise AGATE PUNCH.

(1) Dates: The exercise is tentatively scheduled to be conducted during the period March/April 1975. Specific dates have not yet been determined.

(2) Location: In the Camp Lejeune, North Carolina area.

(3) Sponsoring Command: U.S. Atlantic Fleet.

(4) Type Exercise: A medium scale, joint Navy and Marine Corps training exercise to include the exercising of all phases of amphibious operations.

(5) Instrumentation: The primary means of collecting data and information will be through the use of JCS approved data collection forms. A VRS will be used to confirm, when required, the data recorded on the forms and as a backup system in case the data collectors are not able to record some essential data elements.

h. Exercise SOLID SHIELD 75.

(1) Dates: The exercise is tentatively scheduled to be conducted during May/June of 1975. Specific dates have not yet been determined.

(2) Location: In North and South Carolina.

(3) Sponsoring Command: Atlantic Command.

(4) Type Exercise: A JCS directed, large scale, joint training exercise which will employ forces of the four Services.

(5) Instrumentation: The primary means of collecting data and information will be through the use of JCS approved data collection forms. A VRS will be used to confirm, when required, the data recorded on the forms and as a backup system in case the data collectors are not able to record some essential data elements. The RMS will be used to collect data in the target area.

3. Analysis of Coverage.

a. General.

(1) The eleven CAS objectives are extremely broad in scope. While it is not practical to investigate the numerous possible combinations of operational and environmental test factors, the command sponsoring an exercise which includes CAS validation must take into account overall validation requirements when writing the exercise scenario. Additionally, during the exercise a close and active working relationship must exist in the field between the Exercise Control Group and the Joint CAS Validation Headquarters. The Exercise Control Group can then coordinate exercise play to meet both training and validation needs.

(2) The volume of immediate CAS sorties needed for optimum coverage of validation objectives in an exercise will exceed that which is normally anticipated during exercise training. This deficiency can best be alleviated by a realistic scenario adjustment that generates a heavier than normal percentage of fire support requests to be satisfied by CAS.

b. Factors Affecting Validation.

(1) Operational and Environmental Constraints. The following are recognized as some of the general constraints on data collection. Though they apply to all of the validation exercises, the degree of impact of any one constraint may vary widely between exercises because of location, size, scenario, etc.

(a) Primary Constraints.

1. Priority of training objectives over validation objectives (directed by JCS).

2. Safety considerations.

(b) Additional Constraints.

1. Restricted size of the air and ground maneuver areas.
2. Civilian air traffic control requirements.
3. Equipment and personnel limitations.
4. Fiscal limitations.
5. Weather.
6. Limited participation of supporting elements.
7. Operational conflicts (e.g., availability of communications frequencies).
8. Facilities limitations.
9. Availability of new/improved equipment.

(2) Test Condition Factors. While some objectives, such as #1 (Response Times) can be substantially documented, others such as #4 (Capacity) can be documented only to a limited degree because of both internal and external constraints. Additionally, some objectives such as #9 (Intelligence) do not lend themselves readily to quantitative data collection. Each of the eleven test objectives is listed below along with the principal factors affecting its validation in tests and exercises.

(a) Objective #1 (Response Times). All necessary data will be generated through the introduction of environmental and operational factors.

(b) Objective #2 (Communications).

1. Unscheduled communications failures and use of alternate communications are expected and thus need not be specifically simulated to satisfy this objective. The data and information collected in the data collection forms will reflect the effects of normal as well as degraded and alternate communications throughout the system.

2. ECM and secure voice should be used as available to document effects on the command and control systems. (It is recognized that use of ECM against the command and control systems in an exercise may be limited because of safety considerations.)

(c) Objective #3 (Integration). Problem play should allow, as applicable, integration of CAS with artillery, naval gunfire, air defense, air space control and other tactical operations in varying degrees of intensity and in both target rich and target poor environments.

(d) Objective #4 (Capacity). A combination of safety considerations and fiscal/equipment/personnel limitations restricts saturation of the various nodes of the command and control systems in peacetime. Within these constraints, however, some data may be gathered by loading selected nodes to capacity with actual CAS requests in conjunction with other mission requests. Additionally, capacity of a final controller to handle aircraft can be documented. Determination of the full system capacity of the three command and control systems, however, will require additional information from supplemental sources external to the exercise program.

(e) Objective #5 (Training). As directed by JCS, this objective will be addressed by the Services.

(f) Objective #6 (Weather Degradation). Safety considerations and inability to generate reduced visibility will limit the accomplishment of this objective. Procedures can be established, however, to permit simulation of all-weather direction systems during VFR conditions to prove capabilities of internal as well as external reference systems.

(g) Objective #7 (Target Acquisition). Only test condition factors applicable to the target area affect Objective #7. All necessary factors will occur as a natural consequence of documenting the base case and various test conditions for the other objectives.

(h) Objective #8 (Equipment Degradation). It will be difficult during an exercise to measure the effects of both actual and simulated equipment failures. Use of an alternate circuit, transfer of functions to parallel elements, etc., can be measured if all other factors are held constant. Each simulated degradation requires careful planning and control and should be effected at only one or a very limited number of elements simultaneously.

(i) Objective #9 (Intelligence). Each exercise scenario should require the development and reporting of intelligence under all available operational and environmental conditions throughout the exercise to determine how the availability or non-availability of intelligence and friendly data aids in decision-making within the command and control system for CAS. Determination of the objective does not require an evaluation of the intelligence information itself. Rather it requires a subjective determination on the availability or non-availability of intelligence and/or friendly information. It is the least quantitative of the validation objectives and only limited data can be procured in the exercise program.

(j) Objective #10 (Compatibility/Interoperability).

1. Tactical command and control systems are compatible when necessary information can be exchanged in a usable form and if the equipments or systems being interconnected possess comparable performance characteristics.

2. Tactical command and control systems are interoperable when their respective automated tactical data systems have the ability to exchange data in a prescribed manner and process such data so as to extract intelligible information which can be used to control/coordinate operations.

3. Additional test condition factors need not be specifically introduced into the command and control systems to generate data to determine system compatibility and interoperability. Secure mode communications documented for Objective 2 also provides compatibility information. Unscheduled communication outages also may provide data on compatibility of alternate communications. Since the command and control systems are not scheduled to have automated elements throughout, only limited data may be collected on interoperability during the exercise program. Data may be collected on the interoperability of the Navy Tactical Data System/Marine Tactical Data System in the TACC/TADC nodes.

(k) Objective #11 (New/Improved Equipment). Effect of new/improved equipment on the command and control systems will be documented as specific pieces of equipment are offered by the individual Services. To properly gauge the effect on the system, both the new piece of equipment and the equipment that it replaced should be utilized in the same exercise. Emphasis will be placed on utilizing the new/improved equipment listed in the DCP.

4. Extent of Coverage of Exercise Data Requirements in Individual Exercises.

a. General.

(1) Data requirements for CAS validation in the exercise program are keyed to the base case discussed in Chapter II. The base case is defined as a combination of the simplest operational and environmental conditions for providing CAS. For analytical purposes, documentation of the base case for

each aircraft source (e.g., ground alert, divert, etc.,) is a prime objective since this establishes the standards against which a variation of these key conditions can be measured.

(2) Ideally, variations to the base case would be measured singly (i.e., all but one base case condition would remain constant). As a practical matter, this is not possible in an exercise schedule that addresses training requirements as the primary objectives and utilizes a free play or semi-controlled scenario. Though the sponsoring command will consider CAS validation objectives, both in writing the scenario and during the exercise play, only limited influence can be exerted on the exercise to generate desired test conditions. Consequently, combinations of variations to the base case will be documented as they occur and one CAS mission may document several iteration requirements simultaneously.

(3) A continuing assessment of data coverage will be made during each exercise. As data generation and collection problems are identified, the CAS Validation Headquarters may request the Exercise Control Group to adjust the scenario to produce more useful validation data.

(4) Data deficiencies identified during the course of the exercise program may lead to recommendations by the CAS Validation Headquarters to the sponsoring commands for scenario adjustments in subsequent exercises.

(5) At the conclusion of the total exercise program, any data deficiencies may be addressed through alternate sources of information (e.g., combat data, computer simulation, subjective comments, etc.). Care must be taken, however, that qualitative data collected in the exercises is not biased by improperly validated information from supplemental sources.

b. Summary of Exercise Data Requirements. Figure 3-2 depicts the total minimum data requirements for the three command and control systems for the full exercise program. Each number represents the minimum valid iterations required to establish the data point for that condition in order to provide the desired analytical confidence level.

c. Exercise Coverage. Figures 3-3, 3-4, and 3-5 depict the minimum desired data for each command and control system in each of the exercises utilizing that system. The inclusion and degree of coverage of a specific operational or environmental condition in a given exercise is tentative only and may be changed as coordinated between the Joint CAS Validation Headquarters and the sponsoring command.

d. Other Operational and Environmental Conditions. Due to the complexity and large number of variables in the command and control systems, a choice had to be made by the Joint CAS Validation Headquarters as to which conditions would be specifically documented. These variations are addressed in Figures 3-2 through 3-5. Additional operational and environmental conditions exist, however, for which data is very desirable. Though not formally documented as variations to the base case, data on some of these conditions will be collected on the data collection forms. This, coupled with interpolation of the overall exercise program data collected for the interacting test conditions, can provide significant additional data on the three command and control systems' capabilities in furnishing CAS. These additional operational and environmental conditions include, but are not limited to, the following:

(1) Tactical Situations

(a) Offensive

(b) Defensive

(c) Retrograde

(d) Broad Front

(2) Type Target

(a) Open

(b) Cluttered

5. Additional Considerations.

a. General. The scope of the DTP is limited to the selected exercises referred to in paragraph 2. However, to fully respond to the JCS guidance in addressing the objectives, there may be a requirement for supplemental sources of data and information in order to fully validate the CAS Phase II Study Results. This section identifies and discusses these sources which could be used to provide supplemental data and information for the overall validation effort.

b. Application of Other Sources of Information.

(1) Additional data and information may be provided from several sources. This data and information can be used providing the CAS Validation Headquarters considers it will assist in the overall validation effort and preparation of the final report to the JCS in addressing the deficient areas which could not be documented during the exercise program.

(2) These sources are as follows:

(a) Command Post Exercises (CPX's). CPX's may be useful in providing data and information for the validation effort. A CPX can be used in conjunction with a scheduled exercise to gather additional data for those objectives which may not be adequately addressed in the exercise play. A CPX may be used to collect data and information, providing the Unified Commander agrees.

(b) Combat Data. Upon completion of the exercise validation schedule, specific data shortfalls may be recognized. If this is the case, a determination should be made delineating whether the deficient area(s) may be addressed with the insertion of combat data. The CAS Validation Headquarters may request specific Services or Agencies to provide clearly defined data for this purpose. However, prior to the data being used, the data and source of the data must be identified in order that it may provide a meaningful input.

(c) Subjective Comments. Subjective comments from the Services and Unified Commanders may be of value in the validation efforts. Services and Unified Commands will provide subjective comments as tasked by JCS. A requirement may exist for such subjective comments to place the understandably constrained exercises in the context of a real-world environment. If the requirement exists, the Validation Headquarters may request the Command sponsoring the exercise to provide subjective comments to fill data holes in specific areas or on specific objectives upon termination of the exercise. Also upon conclusion of the entire exercise program, the Services or Unified Commanders may elect to submit subjective comments to clarify specific areas. Therefore, the Services and Unified Commanders may submit subjective comments, as appropriate or as requested, to the Validation Headquarters. For clarity and standardization, subjective comments (professional insights) will be accomplished by two separate methods as necessary: (1) subjective treatment of each objective and (2) subjective treatment of the analyzed data after each exercise or at the conclusion of the CAS exercise program.

(d) Development of Subjective Areas. Subjective areas will be developed by the Joint CAS Validation Headquarters once the validation effort commences. This will afford the Headquarters an opportunity to observe data collectors, discuss deficiencies in the exercise play with the control group and analyze exercise data. It is anticipated that meaningful subjective questions may be developed to assist in requesting specific comments from the command sponsoring the exercise.

SUMMARY OF EXERCISE MINIMUM DATA REQUIREMENTS

Command and Control System		ARMY// AIR FORCE	ARMY ATTACK HELICOPTER	NAVY// MARINE CORPS
Operational and Environmental Conditions				
<u>BASE CASE (See Chapter II)</u>				
Ground Alert	15			15
Ground Alert Forward		15		15
Deck Alert				15
Air Alert	15			15
Divert	15	15		15
<u>VARIATIONS TO BASE CASE</u>				
Night	10		10	10
Reduced Visibility	10		10	10
Damage to Element(s)	10		10	10
Secure Voice	10		10	10
*New Equipment	10		10	10
Substantial Air Threat	10		10	10
Substantial AAW Threat	10		10	10
Target Rich	10		10	10
System Interoperability	10		10	10
ECM Threat	10		10	10
Inadequate Intelligence	10		10	10

*Iterations shown required for each piece of new equipment documented.

FIGURE 3-2

MINIMUM DESIRED EXERCISE COVERAGE
ARMY/AIR FORCE SYSTEM

Exercises	GALLANT CREW 74	BRAVE SHIELD IX	REFORGER 74	CARAVAN III	GALLANT EAGLE	SOLID SHIELD 75
Operational and Environmental Conditions						
<u>BASE CASE (See Chapter II)</u>						
Ground Alert	4	4	4	4	4	4
Air Alert	4	4	4	4	4	4
Divert	4	4	4	4	4	4
<u>VARIATIONS TO BASE CASE</u>						
Night						
Reduced Visibility	4	4	4	4	5	5
Damage to Element(s)	4	4	4	4	4	4
Secure Voice						
*New Equipment					5	5
Substantial Air Threat	4	4	4	4	4	4
Substantial AAW Threat	4	4	4	4	4	4
Target Rich	4	4	4	4	4	4
System Interoperability	4	4	4	4	4	4
ECM Threat	4	4	4	4	4	4
Inadequate Intelligence	4	4	4	4	4	4

*10 iterations for each piece of new equipment.

FIGURE 3-3

MINIMUM DESIRED EXERCISE COVERAGE
ARMY ATTACK HELICOPTER SYSTEM

Operational and Environmental Conditions	GALLANT CREW 74	BRAVE SHIELD IX	REFORGER 74	CARAVAN III	GALLANT EAGLE	SOLID SHIELD 75
BASE CASE (See Chapter II)						
Ground Alert Forward Divert	4 4	4 4	4 4	4 4	4 4	4 4
VARIATIONS TO BASE CASE						
Night	4	4	4	4	4	4
Reduced Visibility	4	4	4	4	4	4
Damage to Element(s)	4	4	4	4	4	4
Secure Voice						
*New Equipment						
Substantial Air Threat	4	4	4	4	4	4
Substantial AAW Threat	4	4	4	4	4	4
Target Rich	4	4	4	4	4	4
System Interoperability	4	4	4	4	4	4
ECM Threat	4	4	4	4	4	4
Inadequate Intelligence	4	4	4	4	4	4

*10 iterations for each piece of new equipment.

FIGURE 3-4

MINIMUM DESIRED EXERCISE COVERAGE
NAVY/MARINE CORPS SYSTEM

Operational and Environmental Conditions	Express Charger	Agate Punch	Solid Shield 75
<u>Exercises</u>			
<u>BASE CASE /See Chapter II)</u>			
Ground Alert	5	5	6
Ground Alert Forward	5	5	6
Deck Alert		7	8
Air Alert	5	5	6
Divert	5	5	6
<u>VARIATIONS TO BASE CASE</u>			
Night	5	5	6
Reduced Visibility	5	5	
Damage to Element(s)	4	4	5
Secure Voice	5	5	
*New Equipment			
Substantial Air Threat	5	5	
Substantial AAW Threat	5	5	
Target Rich	4	4	5
System Interoperability		5	5
ECM Threat		5	5
Inadequate Intelligence	4	4	5

*10 iterations for each piece of new equipment tested.

FIGURE 3-5

CHAPTER IV

EXECUTION

1. General.

a. Purpose. The purpose of this chapter is to outline the organization, functions, tasking and procedures to be used in JCS exercises approved for the CAS data collection effort. Guidelines concerning items to be included in the DITP, the concept for exercise data collection, and specific information on the three command and control systems for CAS, as well as the types of CAS aircraft to be used during the selected exercises are also included.

b. Specific Information on Service Command and Control Systems for CAS.

(1) The command and control networks for the Army/Air Force, Army Attack Helicopter and Navy/Marine Corps CAS systems are depicted in Figures 4-1, 4-2, and 4-3. The target area command and control network for all three systems is shown in Figure 4-4.

(2) The tactical air control systems will be operated by U.S. forces only.

(3) The following command and control elements for the three CAS systems will be deployed into the exercise areas during the data collection effort. The command and control system will be task-organized to meet the exercise training objectives. Therefore, all elements may not be employed in all exercises.

(a) Army/Air Force Command and Control System for CAS

1. Control Elements.

a. Battalion Command Post (BN CP).

b. Brigade Command Post (BDE CP).

c. Division Tactical Operations Center (DTOC).

d. Corps Tactical Operations Center (CTOC).

e. Direct Air Support Center (DASC). During exercises, the DASC will be organized to include the CAS section. All functions of this section as outlined in TACM 55-46 pertaining to CAS request processing, coordination, mission assignment and control, will be accomplished within the DASC.

f. Tactical Air Control Center (TACC).

g. Control and Reporting Center (CRC).

h. Control and Reporting Post (CRP).

i. Tactical Unit Operations Center (TUOC).

j. Forward Air Controller (FAC).

k. Air Support Radar Team (ASRT).

l. Forward Air Control Post (FACP).

m. Airborne Battlefield Command and Control Center (ABCCC).

n. Tactical Airborne Warning and Control System (TAWACS).

2. The below listed types of CAS aircraft will be utilized. Specific types and numbers of CAS aircraft will be included in the DITP for each of the selected exercises: A-7, A-37, F-4, F-105, F-100, F-111 and AC-130.

(b) Army Attack Helicopter Command and Control System for CAS.

1. Control elements.
 - a. Battalion Command Post (BN CP).
 - b. Brigade Command Post (BDE CP).
 - c. Division Tactical Operations Center (DTOC).
 - d. Corps Tactical Operations Center (CTOC).
 - e. BN, BDE, Div Ground Alert (launch sites).
 - f. Ground Commander (Controller).

2. Lessons learned during exercises in late CY 73 and inspection of the troop lists for the selected exercises revealed that the prospects of gaining the desired amount of meaningful data on the Army Attack Helicopter Command and Control System for CAS were not favorable. Accordingly, appropriate recommendations will be made for each exercise which includes Army participation to insure that an appropriate Attack Helicopter Unit is included. Additionally, scenario control may be required to accomplish the desired paths through the nodes in the system. The below listed aircraft will be utilized. (Specific numbers of aircraft will be included in the DITP for each exercise.): AH-1G.

(c) Navy/Marine Corps Command and Control System for CAS.

1. Control Elements.
 - a. Tactical Air Control Center (TACC) (Afloat).
 - b. Tactical Air Direction Center (TADC) (Afloat).
 - c. Supporting Arms Coordination Center (SACC).
 - d. Tactical Air Direction Center/Tactical Air Command Center (TADC/TACC) (Ashore).
 - e. Tactical Air Operations Center (TAOC).
 - f. Direct Air Support Center (DASC).
 - g. Division Fire Support Coordination Center (DIV FSCC).
 - h. Regiment Fire Support Coordination Center (REGT FSCC).
 - i. Battalion Command Post (BN CP).
 - j. Forward Air Controller (FAC).
 - k. Air Support Radar Team (ASRT).
 - l. Tactical Air Coordinator (Airborne) (TAC(A)).

2. The below listed types of aircraft will be utilized. Specific types and numbers of CAS aircraft will be included in the DITP for each of the selected exercises : Navy: A-6, A-7, F-4; Marine Corps: A-4, A-6, AV-8, F-4.

2. Organization.

a. The USREDCOM/LANTCOM organization, to conduct the CAS Phase II Validation, is shown in Figure 4-5.

b. Manning.

(1) The Joint CAS Validation Headquarters Request Phase Team, Execution Phase Team, and Operations Analysis Team are manned as indicated below.

(a) Joint CAS Validation Headquarters.

<u>Position</u>	<u>Rank</u>	<u>Source</u>
Chief	07	USREDCOM
Deputy Chief	06	LANTCOM
Sponsoring Cmd LNO	06/05	Sponsoring Cmd
Operations Officer	06	USREDCOM
Ass't Operations Officer	05	LANTCOM
*Ass't Operations Officer	05	USREDCOM
**Operations Analyst	05/Civ	USREDCOM
Communications Staff Officer	04/05	USREDCOM
Operations Staff Officer	04/05	USREDCOM
Administrative Officer	05	USREDCOM
***Data Reduction Liaison Officer	05	USREDCOM
Operations NCO	E8	USREDCOM
Operations NCO	E6	USREDCOM
Clerk Typist	E4	USREDCOM
****Clerk Typist	E4	LANTCOM
Steno	Civ	USREDCOM

WSEG project personnel will participate as appropriate.

- * Counterpart to Contractor Data Collection Team Chief.
- ** Counterpart to Contractor Data Analysis Team Chief.
- *** Counterpart to Contractor Data Processing Team Chief.
- **** For LANTCOM exercises only.

(b) Request Phase Team (TDY for Each Exercise).

<u>Position</u>	<u>Rank</u>	<u>Source</u>
Chief	05	LANTCOM
Operations Staff Officer	04/05	USREDCOM
Operations Staff Officer	04/05	LANTCOM

(c) Execution Phase Team (TDY for Each Exercise).

<u>Position</u>	<u>Rank</u>	<u>Source</u>
Chief	05	USREDCOM
Operations Staff Officer	04/05	LANTCOM
Operations Staff Officer	04/05	USREDCOM

(d) Operations Analysis Team. The Operations Analysis Team will consist of the Operations Analyst from the Joint CAS Validation Headquarters as Team Chief and two analysts each from USREDCOM and LANTCOM to be furnished TDY as needed. The team will be responsible for formulating the Detailed Analysis Plan for the total validation effort and for furnishing analysis expertise for all exercises.

(2) Data Collectors. The data collectors will be provided by the command or service conducting the individual exercise selected for the validation of the CAS Phase II Study. Their sole duty during the exercise will be CAS validation data collection. The exact number of Data collectors will vary dependant on size and scope of each exercise, and will be identified in the DTM 60 days prior to the execution of the exercise.

c. Functions.

- (1) The field functions of the Joint CAS Validation Headquarters are to:
 - (a) Provide continuity and standardization of the data collection.
 - (b) Monitor collection of subjective data and assist in the analysis of qualitative and quantitative data gathered during each exercise.
 - (c) Supervise the data reduction effort.
- (2) The functions of the Request Phase Team and Execution Phase Team are:
 - (a) Supervise data collectors on each exercise.
 - (b) Supervise the daily collection of data collection forms.
- (3) The function of the data collectors is to collect quantitative and qualitative data using a standardized format at specified nodes of the command and control system for CAS.
- (4) The functions of the Data Reduction Agency are:
 - (a) Reduce data collected on each exercise.
 - (b) Provide reports as directed by the Validation Headquarters depicting data in meaningful form.
- (5) The functions of the Operations Analysis Team are:
 - (a) Develop a Detailed Analysis Plan for the CAS validation program.
 - (b) Recommend revised requirements for data collection for each exercise.
 - (c) Recommend changes in the presentation of quantitative analysis.
 - (d) Review each DITP for consistency with the Detailed Analysis Plan to insure that exercise play will satisfy the data collection requirements projected for that particular exercise.
 - (e) Prepare a quantitative analysis after completion of each exercise for internal use by the Validation Headquarters.
 - (f) Assist in the preparation of the final analysis of the CAS validation program.

3. Tasking.

- a. Director, Defense Research and Engineering (DDR&E).
 - (1) Review and approve the DTP prior to implementation.
 - (2) Provide funding for instrumentation, data collection, data reduction, etc., as required.
 - (3) Prioritize RMS-2 scheduling for selected exercises.
- b. Joint Chiefs of Staff (JCS). Approve the DTP and forward to OSD (DDR&E).

c. Director, Weapons System Evaluation Group (WSEG).

- (1) Monitor data collection and data reduction.
- (2) Accomplish an independent analysis and report.
- (3) Provide reports in accordance with JCS tasking as amplified in Annex E.

d. Unified Commands/Services.

- (1) Provide required support for the Joint CAS Validation Headquarters.
- (2) Assist the Joint CAS Validation Headquarters in refining CAS Validation cost estimates contained in this plan.
- (3) Submit to the Joint CAS Validation Headquarters a Detailed Individual Test Plan for each selected exercise under their cognizance 60 days prior to the start of the exercise.
- (4) Provide required support for the Request Phase Team, Execution Phase Team and Analysis Team.
- (5) Provide data collectors for each selected exercise (sponsoring command).
- (6) Provide weather observation support during selected exercises.
- (7) During the execution of each exercise, make working records such as logs, journals, CAS request forms, status reports, message hard copies, and debriefing reports available to the data collectors on a non-interference basis for extraction of CAS backup data as required.
- (8) Provide subjective comments on specific exercises when requested.
- (9) Provide recommended changes to data collection forms.
- (10) Provide data from OT&E programs that relate to CAS test objectives as requested.

e. USCINCRD. In coordination with CINCLANT:

- (1) Establish the Joint CAS Validation Headquarters, Request Phase Team, Execution Phase Team and Operations Analysis Team.
- (2) Conduct Data Collectors' School prior to each exercise in the exercise area and in the time frame requested by the sponsoring command.
- (3) Supervise data collection.
- (4) Develop procedures for and accomplish data reduction.
- (5) Develop procedures for and accomplish data analysis.
- (6) Provide reduced data developed from each exercise to the appropriate Service/Command and to WSEG.
- (7) Provide a VRS and supporting personnel.
- (8) For designated exercises, arrange for RMS-2 equipment, siting and support personnel.
- (9) Provide reports in accordance with Annex E.

4. Data Collection.

a. General. Accurate and timely collection and recording of data are the keys to successful validation. Data collection forms have been developed to

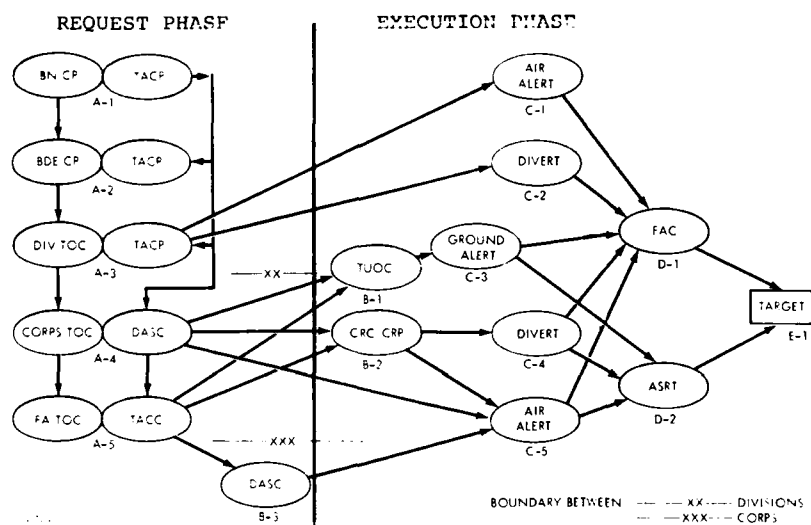
collect and record objective data, supported where necessary by subjective comments. Highly meaningful data will be gathered through the use of dedicated professionally qualified data collectors augmented by instrumentation necessary for accurately recording time and position information.

b. Data Collection Methods. While continuous/critical event observation by professionally qualified, thoroughly trained, dedicated data collectors will be relied upon most heavily for data collection, both ease of collection and precision of data will be increased through the use of the VRS, and in selected exercises, the RMS-2. Specification of data collection instrumentation must be included in the DITP's for each exercise.

(1) Data Collection Forms. Proper use by data collectors of the forms included in Annex C will provide the minimum data required to accomplish the necessary tasks for meeting validation objectives during exercises. This will require well-oriented and knowledgeable data collectors to complete the forms with the necessary degree of exactness and standardization. Data collectors should meet the specified individual qualifications and must complete the pre-exercise school outlined in Chapter V.

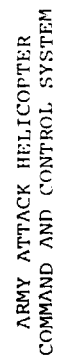
(2) VRS. The VRS will be used in each exercise to provide assistance/backup to the manual data collection effort. The system can record radio/wire transmissions simultaneously from multiple selected channels. All transmissions are recorded on multi-channel magnetic tape and are accompanied by a synchronous time signal which provides the precise time of each transmission. Historically, VRS's have proven useful, reliable and relatively inexpensive as test/exercise instrumentation. USREDCOM will provide VRS equipment, supporting personnel and appropriate training for all exercises.

(3) RMS-2. The RMS-2 is a source of additional information. It is an instrumentation system that collects data from which an x-y-z position can be calculated as a function of time for selected exercise participants, whether airborne or on the ground. Accuracy of position is within a few hundred feet and accuracy of time is within one second. The RMS-2 will also provide an automated method for recording and compiling data in the target area. Use of the RMS-2 in the specific exercises designated in Chapter III for collection of additional data is contingent on availability of the system owned and scheduled by the Director, DDR&E.



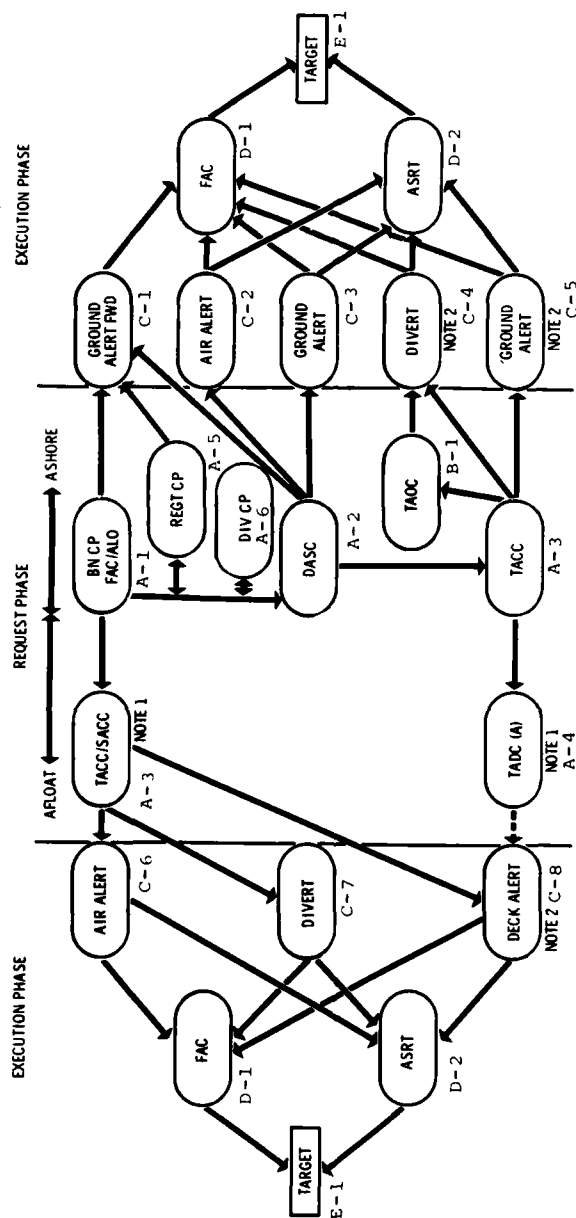
ARMY/AIR FORCE CLOSE AIR SUPPORT
COMMAND & CONTROL NETWORK

FIGURE 4-1



4-8

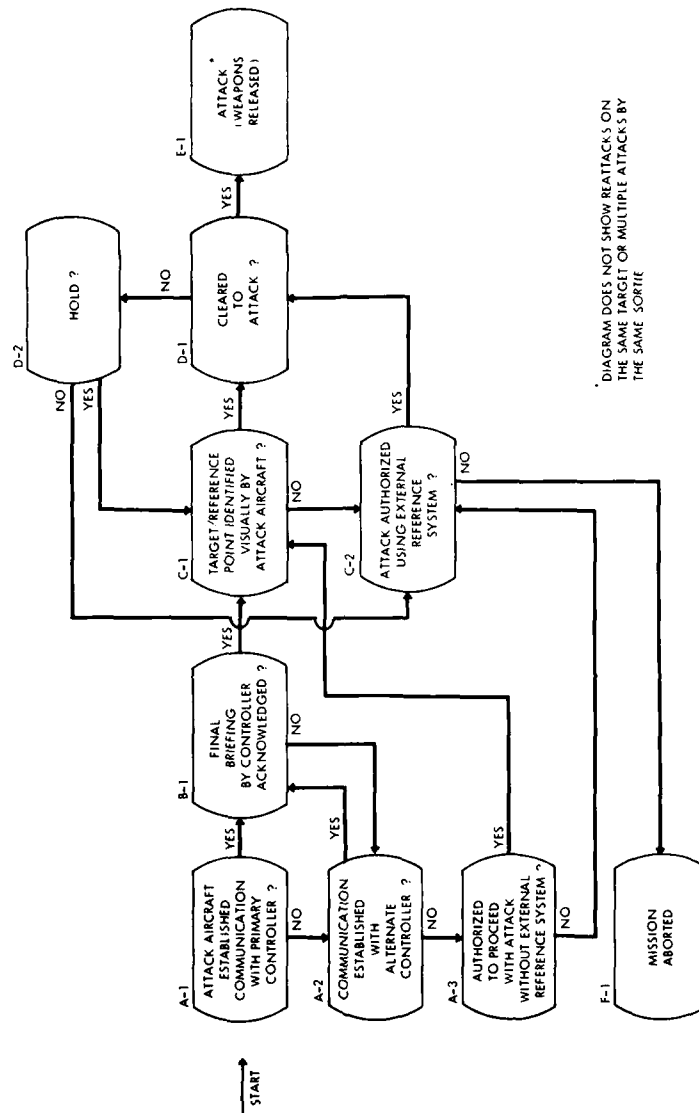
NAVY-MARINE CORPS CLOSE AIR SUPPORT COMMAND AND CONTROL NETWORK (AFLOAT & ASHORE)



- NOTES:
1. TACC IS EITHER AFLOAT OR ASHORE BUT NOT BOTH. WHEN CONTROL MOVES ASHORE, TACC (A) IS ACTIVATED AND SUPPORTS TACC. IN PRACTICE THE C&C NETWORK WILL PHASE GRADUALLY FROM THE AFLOAT CASE SHOWN ON THE LEFT TO THE ASHORE CASE SHOWN ON THE RIGHT.
 2. WITH CONTROL ASHORE, AIRCRAFT DIVERTED OR LAUNCHED BY TACC DIRECTION WILL NORMALLY REPORT TO TACC FOR ENROUTE CONTROL AND DASC FOR MISSION BRIEF PRIOR TO CONTACTING THE TERMINAL CONTROLLER.

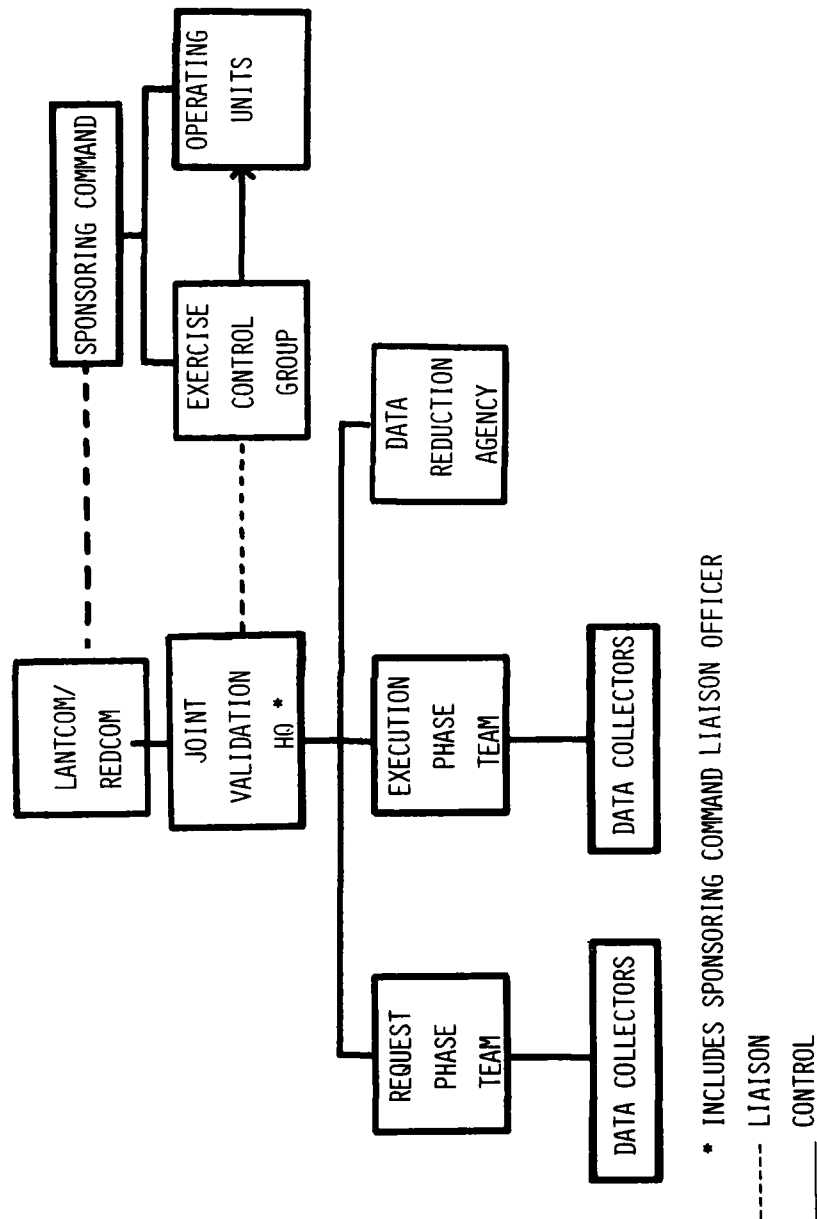
Navy/Marine Corps Close Air Support
Command and Control Network: (Afloat & Ashore)

FIGURE 4-3



TARGET AREA COMMAND AND CONTROL NETWORK

FIGURE 4-4



JOINT CAS VALIDATION HEADQUARTERS

FIGURE 4-5

CHAPTER V

SUPPORT REQUIREMENTS

1. General. The purpose of this chapter is to identify specific support required for each CAS validation exercise and to identify the Command or Agency that will provide this support. Support requirements will be refined by the Validation Headquarters 90 days prior to the exercise start date (30 days prior to the publication of the DITF).

2. USREDCOM. As the coordinating headquarters for the CAS Validation, USREDCOM in coordination with LANTCOM will identify support requirements for each exercise and request the appropriate Command or Agency to provide this support. In addition to identifying support requirements, USREDCOM will provide the following:

- a. A Validation Headquarters, Figure 4-5.
 - b. A schedule, in coordination with DDR&E, for employment of the RMS. The proposed schedule is at Figure 5-1.
 - c. A VRS.
 - d. Staff the Data Collectors' School and present the program of instruction as outlined in Figure 5-2.
 - e. Data reduction via contractual agency.
 - f. CAS data collection forms.
3. Command Sponsoring the Exercise. The Command sponsoring the exercise will be requested by the Validation Headquarters to provide:
- a. Staffing for the Validation Headquarters and the Data Collection Team, Figures 4-5 and 5-3.
 - b. Communications equipment, both radio and wire, to support the Validation Headquarters and data collectors, Figure 5-4.
 - c. Vehicles and helicopters for the Validation Headquarters and data collectors. Ground transport of the RMS and VRS from the point of air delivery to and from the exercise area, Figure 5-5.
 - d. Three surveyed locations and power sources in the exercise area for the RMS, Figure 5-1.
 - e. Assistance to the contractor in the setup and teardown of the RMS in the exercise area.
 - f. Helicopter and vehicle support for the RMS "A" Stations during setup, operation and teardown, Figure 5-5.
 - g. Fixed wing support for the RMS airborne "A" stations, Figure 5-1.
 - h. Current weather reporting in the exercise area.
 - i. Administrative support to include a classroom, office space, equipment and supplies.

4. Instrumentation Requirements. Instrumentation systems identified to support the CAS Validation are the VRS and the RMS. The VRS will be used as a backup for manual data collection in all exercises. The RMS will be used during three exercises. Based on DDR&E's scheduled use of the RMS, the Validation Headquarters, in coordination with DDR&E, will schedule the RMS for CAS instrumentation support. USREDCOM will make available a VRS which meets the monitoring requirements. Availability of instrumentation does not alter the manual data collection requirements.

5. Data Collectors Schooling. A school for data collectors will be conducted by the Validation Headquarters prior to each exercise on dates arranged with the sponsoring command. The program of instruction, instructor requirements and student load is in Figure 5-2.

6. Funding. Complete cost estimates for CAS validation can not be developed at this time. Tentative cost estimates for known requirements are provided herein. These costs will be refined by USREDCOM in coordination with the Command sponsoring the exercise and included in the DITP's. A summary of tentative costs are contained in Annex D.

SCHEDULE AND SUPPORT REQUIREMENTS

RANGE MEASURING SYSTEM (RMS)

	(NOTE 1) PERSONNEL	(NOTE 2) SURVEYED LOCATION	(NOTE 3) VEHICLES	POWER GENERATORS	(NOTE 4) HELICOPTERS (UH-1)	(NOTE 5) FIXED WING (TBD)	SOURCE
BRAVE SHIELD IX 22 Jun - 8 Aug 74 (Alternate)	15	3	*	**	1	1	REDCOM
REFORGER 74 (Oct - Nov 74) (Primary)	15	3	*	**	1	1	EUCOM
GALLANT EAGLE 15 Jan - 15 Feb 75 (Primary)	15	3	*	**	1	1	REDCOM
SOLID SHIELD 75 May-Jun 75 (Primary)	15	3	*	**	1	1	LANTCOM

- * 2 M-52 (5 ton tractors) (NOTE 3)
- 1 M-52 (5 ton tractors w/M-119) (40' x 8' enclosed trailer) (NOTE 3)
- 18 M-35A2 (2 1/2 ton trucks) (NOTE 6)
- 1 M-715A1 (5/4 ton truck) (NOTE 4)
- ** 15 KW, 3 phase, 212 AC, 60 cycle
- 7 KW, 1 phase, 115 AC, 60 cycle

NOTES:

- (1) Personnel required for 15 days to assist in setup of the RMS prior to the exercise and 8 days to assist in teardown after the exercise.
- (2) Three surveyed locations in the exercise area for the RMS orientation.
- (3) 3 5-ton tractors and one 40' x 8' enclosed trailer needed during setup and teardown of the RMS. Then vehicles/trailer would also be required for road movement of the RMS if road movement was selected over air movement.
- (4) Helicopter and 5/4 ton truck required for setup, operation and teardown of the RMS, some 23 days plus exercise period.
- (5) Fixed wing aircraft required for airborne "A" station. The aircraft would be operated at about 20,000 feet above the exercise area.
- (6) Eighteen 2 1/2 ton trucks required to mount mobile RMS "A" Stations and ground movement of the VRS.

FIGURE 5-1

DATA COLLECTORS PROGRAM OF INSTRUCTION

<u>Subject</u>	<u>Duration</u>	<u>Instructor</u>
Welcoming Remarks	15 mins	Validation Headquarters
Administrative Announcements	15 mins	Validation Headquarters
CAS Phase II History and Purpose	30 mins	Validation Headquarters
Exercise Scenario and Organization	1 hr 30 mins	Validation Headquarters
Request and Execution Phase Team Meeting and Briefing	4 hrs	Validation Headquarters
Exercise Area Orientation	4 hrs	Sponsoring Command

<u>Exercise</u>	<u>Student Load*</u>	<u>Location</u>	<u>School Dates</u>
GALLANT CREW 74	34	Fort Bliss, TX	Feb 74
EXPRESS CHARGER	36	Camp Lejeune, NC	Jun 74
BRAVE SHIELD IX	26	Fort Polk, LA	Jul 74
REFORGER 74	41	Germany	Oct 74
CARAVAN III	22	Germany	Jan 75
GALLANT EAGLE	43	Fort Irwin, CA	Jan 75
AGATE PUNCH	45	Camp Lejeune, NC	Mar 75
SOLID SHIELD 75	90	Camp Lejeune, NC	May 75

*Student load (data collectors) is based on forces planned for the exercise and the plan for data collection. Firm requirements will be outlined in the Detailed Individual Test Plan.

FIGURE 5-2

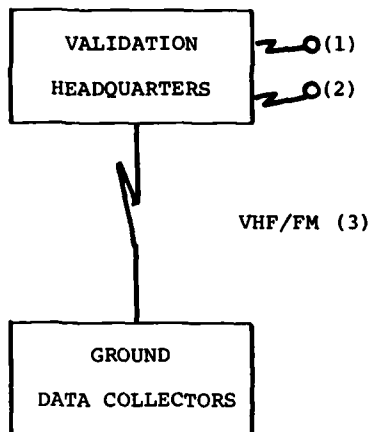
	GALLANT CREW 74	EXPRESS CHARGER	BRAVE SHIELD IX	REFORGER 74	CARAVAN III	GALLANT EAGLE	AGATE PUNCH	SOLID SHIELD 75
Company (1)	6	0	4	4	4	4	0	9
Bn	6	6	3	9	3	12	6	8/8 (2)
Bde/Rgt/FSCC	2	2	1	3	1	3	2	1/2
Div TOC/FSCC	1	0	1	1	1	1	0	1/2
Corp TOC	0	0	0	1	0	0	0	1/0
TACP	6	6	3	9	3	9	6	3/8
Air Data Coll (OH-58) (3)	2	0	2	2	2	2	0	2/0
Other	1	0	0	1	0	1	0	0/0
DASC	1	4	1	1	1	1	4	2/4
SACC/TACC/TADC	0	0	0	0	0	0	6	0/6
TACC (5)	1	4	1	1	0	1	5	1/4
CRC (5)	1	0	1	1	1	1	0	1/0
CRP (5)	1	0	1	1	0	1	0	1/0
FACP	0	0	1	1	1	0	0	1/0
TUOC/Launch Site	1	6	1	0	0	1	8	2/8
TAOC (5)	0	2	0	0	0	0	2	0/2
ASRT	0	4	1	1	0	0	4	1/4
TAWACS	0	0	0	0	0	1	0	1/0
FAC (A) (4)	3	0	3	3	3	3	0	3/0
Alternates	2	2	2	2	2	2	2	2/2
Total	34	36	26	41	22	43	45	40/50

NOTES:

- (1) Dedicated data collectors for the attack helicopter.
- (2) First number is Army/Air Force data collectors. The second number is Navy/Marine data collectors.
- (3) Data collector in a helicopter will observe attack helicopter strikes.
- (4) Data collector will ride in O2/OV-10 FAC aircraft.
- (5) Data collectors in fixed installations will be provided a position and communications from where the applicable data can be recorded.

DATA COLLECTOR REQUIREMENTS (Estimates)

FIGURE 5-3



NOTES:

(1) Long local telephone off the following exercise switchboards:

- a. Exercise Director Headquarters.
- b. Joint Task Force Headquarters, if different from Exercise Director Headquarters.
- c. Each component Headquarters, where circuits are available. In all cases, as a minimum, access to the AFFOR TTC-30 switchboard is required.

(2) Two each class AA Base/Post telephones.

(3) VHF/FM administrative net for coordination with ground data collectors. Base station at Validation Headquarters; M-151 with radio at designated ground data collection locations. This net will not be additive; i.e., it will interface into an existing evaluation controller net.

COMMUNICATIONS SUPPORT
VALIDATION HEADQUARTERS & DATA COLLECTORS

FIGURE 5-4

TRANSPORTATION REQUIREMENTS FOR
VALIDATION HEADQUARTERS & DATA COLLECTORS
(Estimates)

<u>Exercise</u>	<u>Vehicle/Helicopter Request</u>	<u>Source</u>
* GALLANT CREW 74	2 sedans 23 1/4 ton	USREDCOM
** EXPRESS CHARGER	2 sedans 19 1/4 ton	LANTCOM
* BRAVE SHIELD IX	2 sedans 17 1/4 ton	USREDCOM
* REFORGER 74	2 sedans 33 1/4 ton	USEUCOM
* CARAVAN III	2 sedans 18 1/4 ton	USEUCOM
* GALLANT EAGLE	2 sedans 27 1/4 ton	USREDCOM
** AGATE PUNCH	2 sedans 16 1/4 ton	LANTCOM
* SOLID SHIELD 75	2 sedans 36 1/4 ton	LANTCOM

NOTES:

1. Vehicle requirements for data collectors located at DASC, TACC, CRP, etc., will be determined based on physical location of elements. Requirements will be outlined in the Detailed Individual Test Plans.

2. Approximately 50% of the vehicles will be with radio.

* Two UH-1/CH-46 required to support the Validation Headquarters.
Two OH-58 required to support the data collectors.

** Helicopter support for validation program furnished in conjunction with normal exercise helo admin support.

FIGURE 5-5

ANNEX A

GLOSSARY

- AIR ALERT. A state of aircraft readiness wherein combat-equipped aircraft are airborne and ready for immediate action. It is designed to reduce reaction time and to increase the survivability factor.
- AIR LIAISON OFFICER (ALO). An officer (aviator/pilot) attached to a ground unit who functions as the primary advisor to the ground commander on air operations matters.
- AIR STRIKE. An attack on specific objectives by fighter, bomber, or attack aircraft on an offensive mission. May consist of several air organizations under a single command in the air.
- AIR SUPPORT RADAR TEAM (ASRT). A subordinate operational component of a tactical air control system which provides ground controlled precision flight path guidance and weapons release.
- ALLOCATION. The designation of specific numbers and types of aircraft sorties for use during a specified time period or for carrying out an assigned task.
- ATTACK/RE-ATTACK. Weapons delivery by an airborne vehicle on the designated target(s) to include single and multiple runs on single or multiple targets.
- BEACON REFERENCE DEVICE. An electronic transponder provided for use by a forward air controller for designating a target/reference point to radar-equipped attack aircraft.
- CHAIN OF COMMAND. The succession of commanding officers from a superior to a subordinate through which command is exercised. Also called command channel.
- CLOSE AIR SUPPORT (CAS). Air action against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces.
- COMMAND. The authority which a commander in the military service lawfully exercises over his subordinates by virtue of rank and assignment. Command includes the authority and responsibility for effectively using available resources and for planning the employment of, organizing, directing, coordinating and controlling military forces for the accomplishment of assigned missions.

COMMAND AND CONTROL. The exercise of authority and direction by a properly designated commander over assigned forces in the accomplishment of his mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures which are employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of his mission.

COMMAND AND CONTROL SYSTEM. The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the mission assigned.

COMMAND CENTER. A facility from which a commander and his representatives direct operations and control forces. It is organized to gather, process, analyze, display and disseminate planning and operational data and perform other related tasks.

CONTROL. Authority which may be less than full command exercised by a commander over part of the activities of subordinate or other organizations.

CONTROL AND REPORTING CENTER (CRC). An element of the United States Air Force tactical air control system, subordinate to the Tactical Air Control Center, from which radar control and warning operations are conducted within its area of responsibility.

CONTROL AND REPORTING POST (CRP). An element of the United States Air Force tactical air control system, subordinate to the control and reporting center, which provides radar control and surveillance within its area of responsibility.

CONTROLLER. An individual who directs close air support attacks from either the ground or the air.

DETAILED ANALYSIS PLAN. The Validation Headquarters document that specifies in detail the interrelations of the validation objectives and the requirements for the collection, analysis, and presentation of findings for the CAS validation effort.

DETAILED INDIVIDUAL TEST PLAN (DITP). A specific test plan which provides details of each exercise. This plan will be promulgated by the sponsoring command or service not later than 60 days prior to implementation.

DIRECT AIR SUPPORT CENTER (DASC). A subordinate operational component of a tactical air control system designed for control and direction of close air support and other tactical air support operations and is normally collocated with fire support coordination elements.

DIVERT. To change the target, mission, or destination of an aircraft.

EXTERNAL REFERENCE SYSTEM. A system by which a target or reference point is indicated to the attack aircraft and which has at least one component which is not a part of the aircraft avionics.

FIRE SUPPORT COORDINATION. The planning and executing of fire so that targets are adequately covered by a suitable weapon or group of weapons.

FIRE SUPPORT COORDINATION CENTER (FSCC). A single location in which are centralized communications facilities and personnel incident to the coordination of all forms of fire support.

FORWARD AIR CONTROLLER (FAC). An officer (aviator/pilot) member of the Tactical Air Control Party (TACP) who, from a forward ground (FAC(G)) or airborne position (FAC(A)), controls aircraft engaged in close air support of ground troops.

GROUND ALERT. That status in which aircraft on the ground/deck are fully serviced and armed, with combat crews in readiness to take off within a specified short period of time after receipt of a mission order.

IMMEDIATE AIR SUPPORT. Air support to meet specific requests which arise during the course of a battle and which by their nature cannot be planned in advance.

IMMEDIATE MISSION REQUEST. A request for an air strike on a target which by its nature could not be identified sufficiently in advance to permit detailed mission coordination and planning.

INDIVIDUAL TEST PLAN. A broad outline plan prepared by a Unified Command, Service or Agency, as tasked by JCS, utilizing the format and methodology outlined in the Test Plan Concept, that addresses the structure, scenario, forces involved (to the extent known), level of CAS activity (both real and simulated) and general data collection procedures to be followed in the test(s)/exercise(s) being addressed. (A specific test plan providing details of each test/exercise will be promulgated by the sponsoring Command, Service or Agency not later than 60 days prior to implementation.)

LASER DESIGNATOR. A device capable of marking a target with a laser spot once the target has been acquired.

LASER SEEKER. An acquisition system capable of detecting a laser spot. May be used to locate and identify a specific position, object or target in preparation for, or as an aid to, an attack by close air support aircraft; to differentiate friend from foe; to serve as a means of communication between a controller and a close air support aircraft; or to serve as an aid to delivery of a laser guided weapon.

LASER TARGET DESIGNATION SYSTEM (LTDS) - A cooperative system of laser designator and laser seeker.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS). A United States Marine Corps tactical air command and control system which provides the tactical air commander with the means to command, coordinate, and control air operations within an assigned

sector and to coordinate air operations with other Services. It is composed of command and control agencies with communications-electronics equipment that incorporates a capability from manual through semiautomatic control.

NAP-OF-THE-EARTH FLIGHT. Flight as close to the earth's surface as vegetation or obstacles will permit, while generally following the contours of the earth.

POSITIVE CONTROL. The operation of air traffic in a radar/nonradar ground control environment in which positive identification, tracking, and direction of aircraft within an air space is conducted by an agency having the authority and responsibility therein.

RANGE MEASURING SYSTEM (RMS-2). A system that collects data from which three-dimensional position as a function of time can be calculated for transponder-instrumented aircraft and ground vehicles.

REFERENCE POINT. A prominent, easily located point from which the location of a target may be indicated in terms of distance and direction. The reference point may be a terrain feature, air or ground delivered marking munitions, or other recognizable indicators.

SHORT AIRFIELD FOR TACTICAL SUPPORT (SATS). A shore based system which provides essentially the same facilities for the launch and recovery of tactical aircraft as the deck of an aircraft carrier.

TACTICAL AIR COMMAND CENTER (TACC). The principle United States Marine Corps air operation installation from which aircraft and air warning functions of tactical air operations are directed. It is the senior agency of the Marine Corps Air Command and Control System from which the Marine Corps tactical air commander can direct and control tactical air operations and coordinate air operations with other Services.

TACTICAL AIR CONTROL CENTER (TACC). The principal air operations installation (land or ship-based) from which all aircraft and air warning functions of tactical air operations are controlled (except U.S. Marine Corps; see Tactical Air Command Center above).

TACTICAL AIR CONTROL PARTY (TACP). A subordinate component of a tactical air control system designed to provide air liaison to land forces and for the control of aircraft.

TACTICAL AIR CONTROL SYSTEM (TACS). The organization and equipment necessary to plan, direct, and control tactical air operations and to coordinate air operations with other

Services. It is composed of control agencies and communications-electronics facilities which provide the means for centralized control and decentralized execution of missions.

TACTICAL AIR COORDINATOR (AIRBORNE) (TAC (A)). An officer who coordinates, from an aircraft, the actions of combat aircraft engaged in close support of ground or sea forces. Coordination may include control of close air support attacks.

TACTICAL AIR OPERATIONS CENTER (TAOC). A subordinate operational component of the Marine Air Command and Control System designed for direction and control of all en route air traffic and air defense operations, to include manned interceptors and surface-to-air weapons, in an assigned sector. It is under the operational control of the Tactical Air Command Center.

TACTICAL OPERATIONS CENTER (TOC). A physical groupment of those elements of an Army general and special staff concerned with current tactical operations and the tactical support thereof.

TACTICAL UNIT OPERATIONS CENTER (TUOC). The operations focal point of the tactical unit headquarters. Through the TUOC, the unit commander receives operations orders and combat plans from higher headquarters, controls resources and directs unit operations. Communications are provided for rapid coordination with appropriate elements of the Tactical Air Control System (TACS).

TARGET AREA. That portion of the battlefield wherein close air support attacks are conducted. For the purpose of this report, the boundary of the target area is the distance from the designated target or reference point that a given aircraft flying at normal cruise speed can cover in a specified number of minutes.

VERTICAL AND/OR SHORT TAKEOFF AND LANDING (V/STOL). An aircraft with a vertical and/or short takeoff and landing capability.

VOICE RECORDING SYSTEM (VRS). A system designed to record communications over each of various radio channels. The recordings are made on multi-channel magnetic tape and are accompanied by a synchronous time signal code.

ANNEX B

CONTRACTOR SERVICES

1. General. Technical and managerial support for data processing and presentation will be provided by USREDCOM through the use of a civilian contractor using a team of qualified personnel under the supervision of a senior project manager.
2. Services Provided. The contractor will accomplish the following:
 - a. Define and establish detailed data processing methodology.
 - b. Provide a data processing team to deploy with the Validation Headquarters on each exercise to accomplish rapid reduction of CAS data obtained from the various data collection sources.
 - c. Monitor selected data collection systems to obtain rapid and accurate supporting information for data reduction and validation.
 - d. Monitor the performance of instrumentation and advise the CAS Validation Headquarters concerning the quality of data being provided.
 - e. Process CAS data into a standard, machine language format so that a data bank is available for rapid automated sorting and statistical analysis.
 - f. Prepare the necessary software to permit computer analyses in accordance with established analysis concepts.
 - g. Process exercise results, both individually and collectively, through standard analysis procedures for use in periodic and final reports.
 - h. Research required alternate sources of supporting data for CAS validation and process the appropriate information into formats suitable for comparative analysis.
 - i. Prepare timely reports to assist the CAS Validation Headquarters in determining progress and exercising judicial management.

ANNEX C

DATA COLLECTION FORMS AND INSTRUCTIONS

1. General. The data required to be collected in exercises is depicted in the Joint Data Collection Forms attached as appendices to this Annex. It is recognized that differences in the three command and control networks may make a revised format desirable for field data collection in specific exercises. Sponsoring commands may, at their discretion, substitute locally designed worksheets for use by data collectors in the field provided provisions are made for all data required in the Joint Forms to be collected and the use of the worksheets is coordinated with the Validation Headquarters prior to the exercise. Worksheet data will be transcribed to the Joint Data Collection Forms by the sponsoring command prior to submission to the data reduction agency. Appendix V to this Annex is an example of a worksheet designed to collect data on Air Force CAS aircraft in the terminal area.

2. Collection Instructions. The purpose of the instructions attached to the forms is to provide sufficient guidance to data collectors to enable them to properly record required data. It should be noted that not all conditions that may be encountered can be covered in these instructions; however, detailed amplification of data collection requirements will be addressed in data collector training immediately prior to each exercise. This training will be conducted by the Validation Headquarters as shown in Figure 5-2. The command sponsoring the exercise is encouraged to supplement this training to the extent it deems desirable.

3. Data Collection Inadequacies. When an occasion arises where the data collection instructions are not adequate, the data collector should report the problem by the most expeditious means to his data collection phase team chief. In any event, he should continue to record data to the best of his capability till further direction is received from the Validation Headquarters.

4. Appendices 1 through 6 are as follows:

- Appendix I - Request Phase Form and Instructions
- Appendix II - Launch Site Form and Instructions
- Appendix III - Enroute Control Form and Instructions
- Appendix IV - Target Area Form and Instructions
- Appendix V - Sample Worksheet (Target Area) and Instructions
- Appendix VI - Delay Codes

APPENDIX I
COMMAND AND CONTROL FOR CLOSE AIR SUPPORT
DATA COLLECTION FORM NUMBER 1 (REQUEST)

1. Location of Data Collector _____
2. Unit/Element Identification Number _____
3. Date (Day/Month/Year) _____
4. Close Air Support Request Number _____
5. Mission Number _____
6. Unit Requesting CAS _____
7. Time Request Received/Monitored _____
8. Time CAS Decision Announced/Approved/Disapproved _____
9. Time First Attempt to Transmit CAS Request/Disapproval _____
10. Time CAS Request/Disapproval Transmitted _____
11. Time CAS Request/Disapproval Acknowledged _____
12. CAS Decision/Request/Disapproval Transmitted to:

<u>Army Attack Helo</u>	<u>Army/Air Force</u>	<u>Navy/USMC</u>
01 BN GRND ALERT	11 CORPS TOC/	19 GRND ALERT FWD
02 BDE GRND ALERT	DASC	20 GRND ALERT
03 DIV GRND ALERT	12 FA TOC/TACC	21 DECK ALERT
04 CORPS GRND ALERT	13 TUOC	22 AIR ALERT
05 BN CP	14 GRND ALERT	23 DIVERT
06 BDE CP	15 AIR ALERT	24 DASC
07 DIV TOC	16 DIVERT	25 TACC
08 CORPS TOC	17 CRC/CRP	26 NA (APPROVED
09 AVN OPNS LNO	18 NA (APPROVED	BY SILENCE)
10 DIVERT	BY SILENCE)	
13. State Reason (See Codes) If there was a Delay Between:
 - a. Request Rec'd and Decision Announced (N/A BN level). Explain _____
 - b. Decision Announced and First Attempt Transmit. Explain _____
 - c. First Attempt Transmit and Transmitted. Explain _____
 - d. Transmitted and Acknowledged. Explain _____
14. Were Alternate Communications Used: 01 YES 02 NO _____
15. If Alternate Communications Were Used, Describe Type _____

DATA COLLECTION FORM #1 CONTINUED

16. Was ECM Encountered: Ø1 YES Ø2 NO

17. If ECM Was Encountered, was it Countered: Ø1 YES
Ø2 NO (a) Describe How

18. Was New Equipment Used (Other Than Current/Standard
TOE/TE) to:

a. Receive CAS Request: Ø1 YES Ø2 NO

b. Transmit CAS Request: Ø1 YES Ø2 NO

c. Other Aids: Ø1 YES Ø2 NO

(1) Specify:

19. List the New Equipment and What it Replaced:
Item Used It Replaced

a.

b. Were Any Time Savings Discernible Ø1 YES Ø2 NO
Ø3 Unable to Determine

c. Estimated Time Savings from New Equipment (In Mins)

20. Were There Any Problems Communicating with Other
Services: Ø1 YES Ø2 NO Ø3 N/A. If Yes, Explain

21. Could Automated Tactical Data System Exchange Data
in a Usable Form with other Services Tactical Data
Systems: Ø1 YES Ø2 NO Ø3 N/A. (a) If NO, Explain

22. Remarks:

DATA COLLECTOR:

NAME & NUMBER

INSTRUCTIONS FOR COMPLETING FORM #1

1. Instructions for data collectors within the Army Attack Helicopter command and control system for CAS are as follows:

- a. Item 1. For example: BN CP, BDE CP.
- b. Item 2. Enter the unit identification where the data collector is located; for example, 1st Sqdn, 9th Cav.
- c. Item 3. Enter day by day, month, year; e.g., 26 Oct 74.
- d. Item 4. N/A Army System.
- e. Item 5. N/A Army System.
- f. Item 6. Enter unit designation of requesting unit.
- g. Item 7. N/A at BN level; other locations enter time received in local time.
- h. Item 8. Time decision announced (usually at BN level) or approved (unit having aircraft under its control).
- i. Item 9. Refers to time first attempt to pass request (will be time that mike was picked up to transmit request).
- j. Item 10. Enter time that transmission of request was completed.
- k. Item 11. Enter time that transmission of request was acknowledged.
- l. Item 12. Enter code designation of appropriate unit.
- m. Items 13, 14 and 15. Self Explanatory.

NOTE: In items 7-12, circle appropriate action; i.e., request, approval, or disapproval.

2. Instructions for data collectors within the Army/Air Force and Navy/Marine Corps command and control system for CAS are as follows:

- a. Item 1. Enter element of TACS (e.g., DASC, TACC, FAC).
- b. Item 2. Enter unit identification in block; e.g., 3/8.
- c. Item 3. Enter date (day, month, year); e.g., 26 Oct 74.
- d. Item 4. Enter request number designated by DASC or TACC.

FORM #1 Continued

- e. Item 5. Enter aircraft mission number.
- f. Item 6. Enter unit designation of Unit Requesting/CAS.
- g. Item 7. N/A at BN TACP. Time at which a request for CAS is received or monitored at any other node.
- h. Item 8. Enter time BN CMDR (or his authorized rep) made decision to use TAC AIR or time CAS request approved at DASC/TACC.
- i. Item 9. Time first attempted to pass request to DASC/TACC. (Start time to transmit request)
- j. Item 10. Enter time that operator completed transmission of request to DASC or TACC after all items are transmitted and operator gives "over".
- k. Item 11. Enter time that CAS request is acknowledged at any node.
- l. Item 12. Enter code for agency to whom request is transmitted.
- m. Item 13.
 - (1) Enter the delays, if any, and the reason for such delay between times in #7 and #8 using the codes from the table provided.
 - (2) Reason for delay between times in #8 and #9 using codes from the table provided.
 - (3) Same as (2) except time is between 9 and 10.
 - (4) Same as (2) except time is between 10 and 11.
- n. Items 14 and 15. Self Explanatory.

NOTE: In Items 7-12, circle appropriate action; i.e., request, approval or disapproval.

APPENDIX II
 COMMAND AND CONTROL FOR CLOSE AIR SUPPORT
 DATA COLLECTION FORM NUMBER 2 (LAUNCH SITE)

1. Location of Data Collector: <u>Army Attack Helo</u> Ø1 Attack Helo Grnd Alert	<u>Air Force</u> Ø2 TUOC/Grnd Alert	<u>Navy/Marine Corps</u> Ø3 Deck Alert Ø4 Grnd Alert Ø5 Grnd Alert Fwd (AV-8)	
2. Unit/Element Identification Number			
3. Date (Day/Month/Year)			
4. Close Air Support Request Number			
5. Unit Directing CAS Request			
Ø1 BN	Ø5 MAF		
Ø2 REGT	Ø6 CORPS		
Ø3 BDE	Ø7 DASC		
Ø4 DIV	Ø8 TACC		
6. Mission Number			
7. Flight Call Sign			
8. Number/Type Aircraft in Flight			
9. Aircraft Alert Condition (In Minutes)			
10. Time Launch Order Received			
11. Time Launch Order Received by Flight Leader			
12. Take Off Time			
13. Time Mission Aborted (If Applicable)			
14. Reason for Abort or Delay			
15. Next Controlling Agency			
16. Weather at Alert Position			
a. Ceiling (Feet)			
b. Visibility (Miles)			
17. Were Alternate Communications Used: Ø1 Yes Ø2 No			
18. If Alternate Communications Were Used, Describe			
Type _____			

DATA COLLECTION FORM #2 CONTINUED

19. Was ECM Encountered: Ø1 YES Ø2 NO

20. If ECM Was Encountered, Was it Countered: Ø1 YES Ø2 NO
(a) Describe How

21. Was New Equipment Used (Other Than Current/Standard TOE/TE) as an Aid to:

a. Receive CAS Request: Ø1 YES Ø2 NO

b. Transmit CAS Request: Ø1 YES Ø2 NO

c. Other Aids: Ø1 YES Ø2 NO

(1) Purpose

22. List the New Equipment and What it Replaced:
Item Used It Replaced

A. /
/
/

B. Were Any Time Savings Discernible
Ø1 YES Ø2 NO Ø3 Unable to Determine

C. Estimated Time Savings From New Equip (In Mins)

23. Were There Any Problems Communicating with Other Services: Ø1 YES Ø2 NO Ø3 NA

(a) If Yes, Explain

24. Remarks:

DATA COLLECTOR:

NAME & NUMBER

INSTRUCTIONS FOR COMPLETING FORM #2

1. Enter element of TACS (e.g., TUOC, Launch Site).
2. Enter numerical or letter designation of unit (e.g., 1/9, CVA 62).
3. Example: 24 Oct 1974.
4. Enter request number assigned by DASC or TACC (N/A to Army Attack Helicopter).
5. Unit from which launch order is received.
6. Enter aircraft mission number.
7. Tactical voice call sign.
8. Self Explanatory.
9. The condition of readiness from which aircraft launched to meet this request.
10. Time launch order received from unit listed in #5. This is the time that launch site personnel receives the order to launch and not the time that all mission information (frequencies, call signs, coordinates, etc.) are passed as received.
11. Time flight leader receives launch command (may be same as #10). This refers also to only the launch command and not to receipt of other mission information.
12. Self Explanatory.
13. Time of mission abort for any reason, subsequent to being assigned to an immediate CAS mission.
14. Extract reason for abort or delay from tables provided.
15. Next controlling agency the flight was directed to contact (for example TACC, DASC, etc.).
16. Record actual weather or simulated weather if imposed and so indicate.
17. Self Explanatory.
18. Self Explanatory.

APPENDIX III
COMMAND AND CONTROL FOR CLOSE AIR SUPPORT
DATA COLLECTION FORM NUMBER 3 (ENROUTE CONTROL)

1. Location of Data Collector: _____
2. Unit/Element Identification Number: _____
3. Date (Day/Month/Year): _____
4. Close Air Support Request Number: _____
5. CAS Directive Received From: _____
6. Aircraft Source:
 #1 Entering System #4 Divert (Lower Priority
 (Grnd/Deck Alert) Immediate)
 #2 Air Alert #5 Unknown
 #3 Divert (Preplanned)
7. Mission Number _____
8. Flight Call Sign _____
9. Number and Type Aircraft in Flight _____
10. Time of Receipt of CAS Directive _____
11. Time Flight Attempts Radio Contact with Unit _____
12. Number of Flights Under Control _____
13. Time Radio Contact Established _____
14. Time Flight Instructed to Hold (If Applicable) _____
15. Time Aircraft Released from Hold: _____
16. Reason for Hold. Explain _____

17. Time Primary Control Transferred to Next Controlling Agency _____
18. Next Controlling Agency _____
19. Time mission aborted (if applicable) _____
20. Reason for Abort _____
21. State Reason if There was a Delay Between Time:
 a. First Attempt Contact and Contact Established.
 Explain on Reverse.
 b. Time Contact Established and Time Handed Off.
 Explain on Reverse.
22. Were Alternate Communications Used: #1 YES #2 NO _____
23. If Alternate Communications Were Used, Describe Type _____

DATA COLLECTION FORM #3 CONTINUED

24. Was ECM Encountered: ☐1 YES ☐2 NO _____

25. If ECM Was Encountered, Was it Countered: ☐1 YES ☐2 NO
(a) If Yes, Describe Means: _____

26. Was New Equipment Used (Other than current/standard TOE/TE) to:

- a. Receive CAS Request: ☐1 YES ☐2 NO
b. Transmit CAS Request: ☐1 YES ☐2 NO
c. Other Aids: ☐1 YES ☐2 NO
(1) Purpose: _____

27. List the New Equipment and What it Replaced:
Item Used It Replaced

A. _____ /

_____ /
_____ /

B. Were Any Time Savings Discernible
☐1 YES ☐2 NO ☐3 Unable to Determine _____

C. Estimated Time Savings From New Equip (In Mins) _____

28. Were there any Problems Communicating with Other Services: ☐1 YES ☐2 NO ☐3 N/A

(a) If Yes, Explain _____

29. Remarks: _____

Data Collector:

NAME & NUMBER _____

INSTRUCTIONS FOR COMPLETING FORM #3

1. Enter element of the TACS; e.g., CRC, CRP, TACO, FOC, etc.
2. Enter numerical or letter designation of unit, such as 726 TCS, TACRON 21.
3. Example: 24 Oct 74.
4. Enter request number assigned by DASC or TACC (N/A to Army Attack Helicopter).
5. Unit that passed information on the CAS mission (CRC, CRP, DASC, etc.)
6. Self Explanatory.
7. Enter aircraft mission number.
8. Tactical voice call sign.
9. Self Explanatory.
10. Time CAS directive received from unit listed in #5.
11. Time Radio contact was attempted with flight leader.
12. Number of separate flights under control or on hold with the controller prior to this flight attempting radio contact.
13. Time radio contact established with flight leader.
14. Time flight instructed to hold by agency listed in items 1 or 2; the directive to hold may be issued by another agency, but will be listed here if flight is under listed agency's control and ordered to hold by same, and remains under listed agency's control.
15. Time listed unit releases flight from hold.
16. Extract reason from tables provided.
17. Time control transferred to another agency; if flight remains on unit (listed in #1) frequency for monitoring, but is being directed by another agency (i.e., FAC), control will be considered as having been transferred.
18. Next controlling agency (CRC, CRP, FAC, FAA, etc.), the flight was directed to contact.

Form #3 Continued

19. Time of mission abort for any reason, subsequent to being assigned an immediate CAS mission.

20. Extract reason from tables provided.

21. Extract reason from tables provided.

22. Self Explanatory.

23. Self Explanatory.

Divert: If a divert occurs during the enroute phase, start a new Form #3 and in Lines 11 and 13 indicate the times that the divert information was passed and acknowledged by the flight leader.

APPENDIX IV
COMMAND AND CONTROL FOR CLOSE AIR SUPPORT
DATA COLLECTION FORM NUMBER 4 (TARGET AREA)

1. Location of Data Collector _____
2. Unit/Element Identification Number _____
3. Date (Day/Month/Year) _____
4. Close Air Support Request Number _____
5. Mission Number _____
6. Attack Aircraft Call Sign _____
7. Number and type Aircraft in Flight _____
8. Final Controller

Ø1 Grnd Cmdr	Ø4 TAC (A)
Ø2 FAC(A)	Ø5 Helo Plt/Obs
Ø3 FAC(G)	Ø6 ASRT

9. Controller Call Sign _____
10. Time-Attack Acft Attempted Contact w/Primary Controller _____
11. Time-Attack Acft Established Contact w/Primary Controller _____
12. Time-Attack Acft Attempted Contact w/Alternate Controller _____
13. Time-Attack Acft Established Contact w/Alternate Controller _____
14. Time-Target Briefing by Final Controller Ack'd _____
15. Time Target Marked. _____
16. Time-Attack Acft Reports Tgt/Ref Point in Sight _____
17. Time-Attack Acft Cleared to Attack _____
18. Time-Weapons Release _____
19. Time-Attack Acft Told to Hold _____
20. Time-Attack Acft Released from Hold _____
21. Time-Mission Aborted _____
22. Time-Acft Released _____
23. Reason for Delays
 - a. Between Questions ____ and ____ . Explain _____
 - _____
 - b. Between Questions ____ and ____ . Explain _____
 - _____
24. Reason for Hold, If Applicable. Explain _____
- _____
25. Reason for Abort, If Applicable. Explain _____
- _____

DATA COLLECTION FORM #4 CONTINUED

26. If Attack Aircraft Did Not Contact the Controller by Radio, was Other Contact Established (e.g., Radio Relay) Which Permitted Control Ø1 YES Ø2 NO _____
27. How Many Aircraft Were Under Control of the Controller When This Flight:
 - a. Came Under Control _____
 - b. Was Ordered to Hold (If Applicable) _____
 - c. Aborted the Mission (If Applicable) _____
28. Method of Marking Target _____
29. Method of Acquiring Target

Ø1 Visual	Ø4 Radar
Ø2 Laser Spot Tracker	Ø5 Grnd Directed
Ø3 FLIR	Ø6 Other (Specify) _____
30. Initial Target Acquisition Mark Was:

Ø1 Successful	Ø2 Unsuccessful
---------------	-----------------

31. Target Remarkd by: _____
32. Target Description: _____
33. Number of Separate Targets Attacked on this Request: _____
34. Total Number of Runs on Target : _____
35. Command and Control Positioning Was: Ø1 Successful
 Ø2 Unsuccessful. If Unsuccessful, Explain _____

36. Next Controlling Agency _____
37. Weather in Target Area (Ceiling/Visibility) _____
38. Tactical Situation

Ø1 Offensive	Ø3 Delay
Ø2 Defensive	Ø4 Retrograde
39. Terrain in Target Area: Ø1 Open Ø2 Cluttered _____
40. Were Alternate Communications Used: Ø1 Yes Ø2 NO _____
41. If Alternate Communications Were Used, Describe Type: _____

DATA COLLECTOR:

NAME & NUMBER _____

DATA COLLECTION FORM #4 CONTINUED

42. Was ECM Encountered: Ø1 YES Ø2 NO _____
43. If ECM Was Encountered, Was it Countered: Ø1 YES Ø2 NO _____
 (a) If YES, Describe Means: _____
44. Was New Equipment Used (Other Than Current/Standard TOE/TE):
 a. Receiving CAS Ø1 YES Ø2 NO _____
 b. Transmitting CAS Ø1 YES Ø2 NO _____
 c. Marking Target Ø1 YES Ø2 NO _____
 d. Acquiring Target Ø1 YES Ø2 NO _____
 e. Other Ø1 YES Ø2 NO _____
 f. If YES, Describe _____
45. List the New Equipment and What it Replaced:
 a. Item Used / It Replaced
 _____ / _____
 _____ / _____
 _____ / _____
- b. Were Any Time Savings Discernible
 Ø1 YES Ø2 NO Ø3 Unable to Determine _____
- c. Estimated Time Savings from New Equipment if Known
 (In Mins) _____
46. Were There Any Problems Communicating with Other
 Services: Ø1 Yes Ø2 NO Ø3 N/A _____
 a. If Yes, Explain _____
47. Remarks: _____

DATA COLLECTOR:

NAME & NUMBER _____

INSTRUCTIONS FOR COMPLETING FORM #4

1. Enter Element of the TACS, BN, BDE, FAC, TACP, etc.
2. Enter numerical or letter designation of unit, such as 1/9 BN, 704 TASS, etc.
3. Example: 24 Oct 74.
4. Enter request number that was designated by the DASC or TACC (N/A to Army Attack System).
5. Not applicable to Army aircraft; for Air Force and Navy/ Marine Corps aircraft, use mission number from daily frag.
6. Tactical voice call sign.
7. Self Explanatory.
8. Terminal controlling agency in the target area.
9. Self Explanatory.
- 10-13. Refer to radio contact.
14. Time target briefing acknowledged by flight leader.
15. Self Explanatory.
16. Time flight leader reports target/reference point in sight.
17. Time flight leader is cleared to attack.
18. Time flight leader announced initial weapons release on the designated target.
- 19-21. Should aircraft be told to hold/abort, enter time and time of release. Extract reason from tables provided and enter in #23 or #24. Hold on this form is defined as: After assumption of control by the terminal area controller, a flight is directed to enter a holding pattern or otherwise remain clear of the target area until the controller can direct the flight on the target or release it. If the terminal controller requests aircraft be held before he assumes control, this hold will be recorded in the enroute phase. Time of release from hold is the time the terminal controller vectors aircraft from the holding pattern with intent to direct an attack on the target, or starts a target briefing in preparation for immediate attack on the target.

Form #4 Continued

22. Time terminal controller releases flight for return to home station.

23. Explain any delays in the mission sequence (Questions 10 thru 17) by entering a reason from the tables provided and further explanation if necessary.

24-25. See Question 18.

26-31. Self Explanatory.

32. Give nature of target (tank platoon, bunker complex, etc.)

33. Number of geographically separated targets attacked by the same flight.

34. Total number of passes on all targets. Express as 3 x 3, 6 x 3, etc., meaning 3 passes by a flight of 3 or 6 passes by a flight of 3 respectively.

35. Subjective determination by data collector whether command and control system placed the aircraft in a position where it could successfully attack the designated target (Successful/Unsuccessful).

36. CRC, FOC, FAA, etc.

37-41. Self Explanatory.

APPENDIX V

TARGET AREA WORKSHEET (EXAMPLE) ARMY/AIR FORCE SYSTEM

WORKSHEET DATA COLLECTION FORM 4			
DATE: _____	LOC: _____	UNIT ID# _____	
CAS REQUEST # _____	TGT DESCRIPTION _____		
WEATHER: _____	TERRAIN: _____		
TACTICAL SITUATION: _____			
MSN/EVENT # _____		TGT BRIEF ACK'D: _____	
ACFT CALLSIGN: _____		TIME TGT MARKED: _____	
# & TYPE ACFT: _____		METH TGT MARK: _____	
CTRL CALLSIGN: _____		METH TGT REMARK: _____	
# FLTS ALREADY UNDER CTRL: _____		METH TGT ACQ: _____	
ESTB CONTACT: _____		TGT/REF PT ACK'D: _____	
PRI/ALT _____		CLEARANCE: _____	
HOLD: _____ RELEASE: _____		INIT WPNS REL: _____	
ALT COMMO: (YES) (NO)		ATK COMPL: _____ (SUC) (UN)	
REMARKS: _____		# TGT RUNS: _____	
_____		NEXT CTRL AGENCY: _____	
_____		ECM ENCOUNTERED: (YES) (NO)	
_____		NEW EQUIPMENT: (YES) (NO)	
_____		D/C NAME _____	

C-V-1

(Reverse Blank)

INSTRUCTIONS FOR WORKSHEET DATA COLLECTION FORM 4

The worksheet for data collection form 4 will be employed by terminal/target area data collectors for both fixed and rotary wing aircraft attacks. The worksheet is arranged in three parts sequenced in expected actions in the terminal area. A worksheet will be completed for each individual target attacked. If a second target is attacked, a new form will be used. Part II need not be completed on subsequent forms if call sign/mission # are on the second form to insure continuity.

Part I.

- | | |
|--------------------|---|
| Heading | - To be completed prior to arrival of CAS aircraft in the target area |
| Date | - Military date (24 Oct 73) |
| Location | - Ground data collector, airborne data collector, FAC data collector, etc. |
| Req Unit | - Designation of unit requesting or receiving CAS (3/34 Arm; 1/2 CAV) (if known) |
| CAS Request # | - Actual request # (if known). (Not used for attack helicopters) |
| Target Description | - Give nature of target (tank platoon, bunker complex, etc.) |
| Weather | - Data collector estimation of ceiling and visibility in target area (10,000/10 mi) |
| Terrain | - Describe terrain as cluttered or uncluttered |
| Tac Situation | - Of requesting unit (attack, defend, retrograde) delay |

Form #4 Continued.

Part II.

- | | |
|---------------------------------|--|
| Initial Contact | - To be completed while aircraft establishes contact with final controller |
| MSN/Event # | - Aircraft mission number (not used for attack helicopters) |
| Aircraft Call Sign | - Call sign with numerical designator of attack aircraft |
| # and Type Aircraft in Flight | - Self Explanatory |
| Control Call Sign | - Call sign and numeral designator of final controller |
| # Flights Already Under Control | - # of separate flights under control or on hold with the controller when this flight attempted radio contact |
| Establish Contact | - Time, in hours and minutes, of establishment of contact between aircraft and controller. |
| Hold (Release) | - Should aircraft be told to hold/ |
| Abort (Release) | abort enter time and time of release. Place reason in remarks section. Hold on this form is defined as: After assumption of control by the terminal area controller, a flight is directed to enter a holding pattern or otherwise remain clear of the target area until the controller can direct the flight on the target or release it. If the terminal controller requests aircraft be held before he assumes control, this hold will be recorded in the enroute phase. Time of release from hold is the time the terminal controller vectors aircraft from the holding pattern with intent to direct an attack on the target, or starts a target briefing in preparation for immediate attack on the target. |

Form #4 Continued

Alt Commo - (Yes) (No) If other than normal commo channel were employed, cross out (no) and explain channel used in remarks section.

Part III.

Attack: - To be completed during aircraft attack.

Tgt Brief Ack'd - Enter time flight lead establishes target briefing

Time Tgt Marked - Self Explanatory

Meth Tgt Marked - Self Explanatory

Meth Tgt Remarkd - Self Explanatory

Meth Tgt Acq - Describe method target acquired by aircraft

Tgt/Ref Pt Ack'd - Time aircraft establishes identification of target or reference point

Clearance - Time controller clears aircraft for attack

Initial Wpns Release- Time of pickle of first aircraft

Atk Compl - Time controllers call aircraft off target or mission complete

(SUC) (UN) - Subjective determination by data collector whether command and control system placed the aircraft in a position where it could successfully attack the designated target (Successful/Unsuccessful)

Tgt Runs - Number of individual aircraft attacks on this target. Explain as 2x3 (two passes by a flight of 3); 4x1, 4 passes of a single aircraft, etc.

Next Control Agency - Test agency aircraft passed to by controller

ECM Encountered - (YES) (NO) If ECM was encountered, note and explain at remarks on reverse to include how ECM was countered.

New Equipment - (YES) (NO) Identify if new equipment or procedures were employed and explain in remarks section on reverse.

APPENDIX VI
DELAY/ABORT CODES

- | | |
|--|---|
| 01 Primary Communications | 22 Lack of Acft Resources |
| 02 Alternate Communications | 23 Controller Not in Position |
| 03 Communications Security | 24 Attack Acft Not in Position |
| 04 ECM | 25 Clearance from Grnd Auth |
| 05 Authentication Procedures | 26 Insufficient Fuel |
| 06 Frequency Saturation | 27 Unable to Locate/Require Tgt |
| 07 Fire Support Coordination | 28 Safety |
| 08 Air Defense Coordination | 29 FAA Coordination |
| 09 Airspace Saturation | 30 Red Smoke from Exercise Controller |
| 10 Weather Condition | 31 Time to Complete Request Form |
| 11 Equipment Damage | 32 Conflict with Aggressor Air |
| 12 Equipment Loss | 33 No Target |
| 13 Attack Acft Equip Malfunction | 34 Friendly Aircraft Over Target |
| 14 Controller Equip Malfunction | 35 CAS Request Cancelled by Originator |
| 15 Inadequate Intel Data Avail | 36 Unable to Locate Strike Controller |
| 16 Insuff/Inaccurate Tgt Info | 37 Strike Controller Handling Another Flt |
| 17 Friendly Data Avail | 38 Intermittent Communications |
| 18 Incompatibility of TDS | 39 Other _____ |
| 19 R. F. Interference | |
| 20 Interference w/Friendly
Radio/Radars | |
| 21 New Equipment | |

ANNEX D

FUNDING ESTIMATES

1. General. The funding estimates contained in this Annex are provided for general planning purposes only. Refinements/amplifications/additions will be developed throughout the validation effort as more exact information affecting costs in each exercise becomes available.

2. Figures. The following figures are included in this Annex:

- D-1 Funding Estimates (Summary)
- D-2 TDY Breakdown by Type and Quarter
- D-3 Staff TDY - Commercial Air (No Quarters/Mess)
- D-4 CAS Data Collectors TDY
- D-5 Joint Validation Headquarters Exercise TDY
- D-6 Cost Estimates for RMS Operations on Exercises

	2/74	3/74	4/74	1/75	2/75	3/75	4/75	1/76	2/76	TOTAL
TDY (NOTE 1)	2,552	22,930	8,344	24,512	17,094	39,132	33,324	12,800	10,696	121,384
VRS (NOTE 2)	110,000									110,000
"B" UNITS (NOTE 3)		800,000								800,000
DATA REDUCTION CONTRACT (NOTE 4)		49,000	73,300	118,200	97,100	152,800	139,900	81,000	45,600	756,900
INSTRUMENTATION TRANSPORT (NOTE 5)					93,210		39,412			132,622
RMS (ON SITE) APX-82 POD MODIFICATION				(NOTE 7) 44,178	(NOTE 6) 166,803 3,450	(NOTE 6) 166,803 3,450	(NOTE 6) 166,803 3,450			544,587 10,350
TOTAL	112,552	871,930	81,644	186,890	377,657	362,155	382,589	93,800	56,296	2,525,843

NOTES:

1. See figures D-2 through D-5 for TDY explanations.
2. Figure is for fabrication/purchase of 2 VRS's to be utilized in all exercises.
3. Figure is for purchase of 40 additional RMS-2 "B" units
4. Figure is latest estimate of cost for Data Reduction Contract
5. Figures are for C-5 airlift of RMS-2 to Exercises REFORGER 74 and SOLID SHIELD 75
6. Figures are based on use during three exercises and are explained in figure D-6
7. Fixed costs (Pre-test planning, Pre-Survey of aircraft, Software)

FUNDING ESTIMATES (SUMMARY)

FIGURE D-1

	2/74	3/74	4/74	1/75	2/75	3/75	4/75	TOTAL
REDCOM CAS STAFF TDY	2,552	5,688	1,752	3,240	1,752	3,240	1,752	19,976
DATA COLLECTORS		5,440		9,140	6,150	19,140	20,700	60,570
JOINT VALIDATION HEADQUARTERS EXERCISE TDY								
VALIDATION (NOTE 1) HEADQUARTERS AUGMENTATION TDY		5,760	550	6,090	3,150	10,710	4,830	31,090
		6,042	6,042	6,042	6,042	6,042	6,042	36,252
TOTAL	\$2,552	\$22,930	\$8,344	\$24,512	\$17,094	\$39,132	\$33,324	\$147,888

NOTE 1. Figures are based on 6 personnel continually on TDY at USMCDCOM during the period 1 Jan 74 - 30 Jun 75. Three round-trip airline tickets each to Norfolk, VA and Atlanta, GA are budgeted each quarter.

TDY BREAKDOWN BY TYPE & QUARTER

FIGURE D-2

STAFF TDY - COMMERCIAL AIR (NO QUARTERS/MESS)

Location	Number Persons	Number Trips	Number Days	Cost	Total
<u>FY 2/74</u>					
Washington, D.C.	2	4	7	2,552	2,552
<u>FY 3/74</u>					
Washington, D.C.	4	2	2	1,752	
EUCOM	4	1	2	2,448	
ARRED	4	1	2	612	
AFRED	4	1	2	876	5,688
<u>FY 4/74</u>					
Washington, D.C.	4	2	2	1,752	1,752
<u>FY 1/75</u>					
Washington, D.C.	4	2	2	1,752	
ARRED	4	1	2	612	
AFRED	4	1	2	876	3,240
<u>FY 2/75</u>					
Washington, D.C.	4	2	2	1,752	1,752
<u>FY 3/75</u>					
Washington, D.C.	4	2	2	1,752	
ARRED	4	1	2	612	
AFRED	4	1	2	876	3,240
<u>FY 4/75</u>					
Washington, D.C.	4	2	2	1,752	<u>1,752</u>
					\$19,976

STAFF TDY - COMMERCIAL AIR (NO QUARTERS/MESS)

FIGURE D-3

Assumptions: Travel by Military Air; Government Quarters & Mess Available

	Duration (Days)	Number Persons	Cost	Total
<u>FY 3/74</u>				
GALLANT CREW	16	34	5,440	5,440
<u>FY 1/75</u>				
BRAVE SHIELD IX	13	26	3,380	
EXPRESS CHARGER	16	36	5,760	9,140
<u>FY 2/75</u>				
REFORGER 74	15	41	6,150	6,150
<u>FY 3/75</u>				
GALLANT EAGLE	18	43	7,740	
AGATE PUNCH	18	45	8,100	
CARAVAN III	15	22	3,300	19,140
<u>FY 4/75</u>				
SOLID SHIELD 75	23	90	\$20,700	\$20,700
				\$60,570

CAS DATA COLLECTORS TDY

FIGURE D-4

Assumptions: Group Travel by Military Aircraft; Government Mess and Quarters Available; Team Composed of 21 Personnel.

	Duration (Days)	Cost	Total
<u>FY 3/74</u>			
GALLANT CREW	16	5,760	5,760
<u>FY 4/74</u>			
SOLID SHIELD 74*	5	550	550
<u>FY 1/75</u>			
EXPRESS CHARGER	16	3,360	
BRAVE SHIELD IX	13	2,730	6,090
<u>FY 2/75</u>			
REFORGER 74	15	3,150	3,150
<u>FY 3/75</u>			
AGATE PUNCH	18	3,780	
CARAVAN III	15	3,150	
GALLANT EAGLE	18	3,780	10,710
<u>FY 4/75</u>			
SOLID SHIELD 75	23	4,830	4,830
			\$31,090

*Observation Team Composed of REDCOM personnel only.

JOINT VALIDATION HEADQUARTERS EXERCISE TDY

FIGURE D-5

Pre-Test Planning	\$ 13,595	
Software	7,264	
APX-82 Modifications	9,550	
Pre-Survey of CAS aircraft	13,769	
 RMS Installation & Test	 282,213	
 Test Operations	 97,440	
 Teardown	 120,758	
 TOTAL CONTRACTOR COST		<u>\$544,589</u>
 TDY for 15 military personnel, 23 days/exercise to assist in RMS setup and teardown (3 exercises)		<u>10,350</u>
 TOTAL		<u>\$554,939</u>

COST ESTIMATES FOR RMS OPERATIONS ON EXERCISES

FIGURE D-6

ANNEX E

REPORTS

1. General. A dual independent reporting system has been established by the JCS to reinforce the validity of the analysis of the test results. These requirements specify submission of both quarterly and final reports from the USCINCRD/CINCLANT Joint Validation Headquarters and the Weapons Systems Evaluation Group (WSEG). Additionally, Services and Unified Commands are requested to provide information and comments as necessary to support the validation effort.
2. USCINCRD/CINCLANT. The Joint CAS Validation Headquarters and WSEG quarterly report submission dates may be somewhat variable based on availability of exercise data. Newly completed exercises not previously reported on will be addressed separately in the quarterly report to the degree of detail available at the time of submission. The final reports will address all individual exercises and collate all results into a cohesive assessment of each of the three independent command and control networks.
3. WSEG. Provide reports in accordance with JCS tasking as reflected in Figure E-1.
4. Services/Unified Commands. Comments to the Validation Headquarters from the Services and Unified Commands in excess of those specifically requested are encouraged.
5. Required Reports. Specific required reports are depicted in Figure E-1. Changes and/or additions to this list are probable as the validation program progresses. Cognizant commands/agencies will be notified as these changes and/or additions occur.

REQUIRED REPORTS

Report	From	Action	Info	Due
Quarterly	Validation Headquarters	JCS	Unified Commands; WSEG	30 Apr 74 31 Jul 74 31 Oct 74 31 Jan 75 30 Apr 75 31 Aug 75
Quarterly	WSEG	JCS	Validation Headquarters	30 Apr 74 31 Jul 74 31 Oct 74 31 Jan 75 30 Apr 75 31 Aug 75
Exercise Comments	Sponsoring Command	Validation Headquarters	WSEG	As desired (NLT 30 days after exercise)
Final Report	WSEG	JCS	Validation Headquarters	31 Oct 75
Final Report	Validation Headquarters	JCS	Unified Commands; WSEG	31 Dec 75

REQUIRED REPORTS

FIGURE E-1

ANNEX F

CAS OBJECTIVES

1. Objective No. 1. Determination of response times for immediate demands on the close air support (CAS) command and control system, including transmission, processing, and transit time.
2. Objective No. 2. Determination of communication requirements, both ground and airborne, at all levels, including secure transmission needs.
3. Objective No. 3. Determination of the capability to integrate CAS with other tactical operations in the combat area, including the consideration of fire support coordination, air defense, and airspace control functions.
4. Objective No. 4. Determination of maximum system capacity to handle target attacks under clear weather conditions.
5. Objective No. 5. Determination of training requirements for qualification and annual maintenance training of observers, air controllers, and operators for each level above company. Determination of training requirements for combat battalions and tactical air control system units in terms of CAS sorties per year.
6. Objective No. 6. Determination of the degradation of the system's ability to provide effective command and control of CAS at night, in bad weather, or under artificially reduced visibility.
7. Objective No. 7. Determination of the ability of various CAS target acquisition systems to detect and identify hostile targets and hand off these targets to an attacking agent.
8. Objective No. 8. Determination of the extent of system degradation resulting from damage to individual elements.
9. Objective No. 9. Determination of the functioning of intelligence information and friendly data availability as aids in decision-making within the command and control system. Examine information requirements, accuracies, and times involved in entering it in the system and making decisions based on it.
10. Objective No. 10. Determination of the compatibility and interoperability of the elements of the CAS command and control system.
11. Objective No. 11. Evaluation of the improvements offered by new/improved equipments in the other test objectives.

ANNEX G
DISTRIBUTION

SECDEF (DDR&E)	10
JCS	135
CSA	
CNO	
CSAF	
CMC	
DIR DIA	
DIR DCA	
DIR NSA/CH CSS	
CINCAL	5
USCINCEUR	25
CINCPAC	5
USCINCSO	5
CINCLANT	50
CINCLANTFLT	
FMFLANT	
PHIBLANT	
NAVAIRLANT	
DWSEG	10
USCINCARRED	10
USCINCAFRED	10
PROJECT MASSTER	5
USAFTAWC	5
TRADOC	5
USCINCREC	100
J1 (2)	
J2 (4)	
J3 (10)	
J4 (2)	
J5 (20)	
J6 (5)	
CO (2)	
SS-PL (55)	